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AIR COMMERCE

DOMESTIC
FOREIGN



JANUARY 1943

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DAY IN and day out many of our great factories are working to spin a web that will reach around the world—a super highway thru the clouds—to carry valuable cargo in “flying boxcars.” Each succeeding day more cargo will be sent via these air lanes.

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VOL. 2, No. 1

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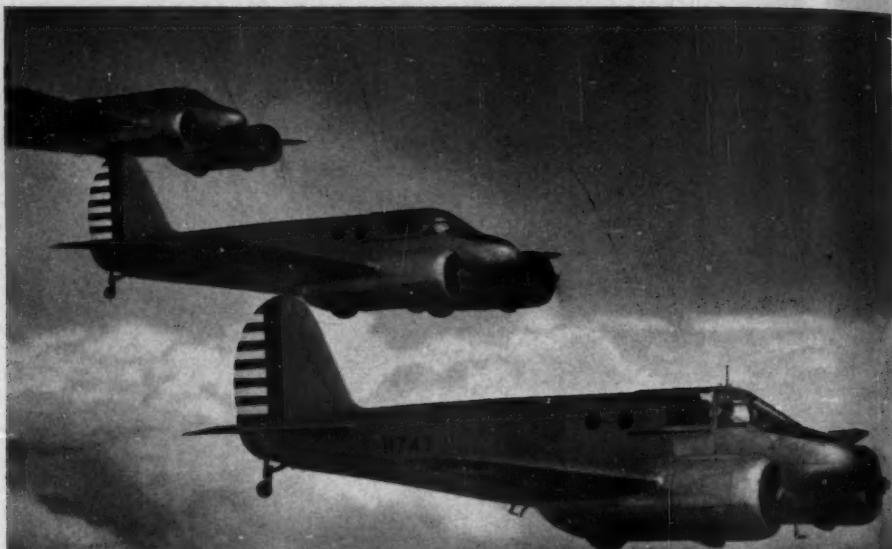
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AIR TRANSPORTATION'S COVER

The Army gets more publicity, but the Navy moves cargo by air, too—and plenty. Here a Navy crew loads a heavy aircraft engine aboard a Navy cargo plane. How much of this goes on nobody knows except the Navy, which isn't talking about it much until Victory. (Official U. S. Navy Photo.)

Sch. of Bus. Bus.



Beechcrafts AT WORK

No. 1
OF A SERIES

AT-10 Beechcraft two-engine Transitional Trainers, shown above, serve the Army Air Forces by providing a means of instructing advanced students in the operation of twin-engined aircraft. These airplanes are equipped with all of the devices required for the actual operation step upward in the training sequence for Army pilots.

The AT-10's combine a high cruising speed with a very conservative landing speed and excellent flight characteristics. They thus permit their pilots to acquire familiarity with high speed two-engine airplanes without imposing any sudden burden upon recently acquired flying skills.

The use of the AT-10's and other similar airplanes as a step in the training of pilots is only one of the many examples of how the Army Air Forces is providing its future combat pilots with the finest training in the entire world.

Beech Aircraft

C O R P O R A T I O N

BEECHCRAFTS ARE DOING THEIR PART



WICHITA, KANSAS, U. S. A.

Down with Ballyhoo . . . Up with the Facts

The last two months of 1942 saw more talk and more in print in the general press about AIR CARGO, perhaps, than any two years that had gone before.

In November, there were the addresses in New York of two of aviation's most distinguished spokesmen: Assistant Secretary of War for Air Robert A. Lovett and United Air Lines' President W. A. Patterson. Their addresses (both, incidentally, published in AIR TRANSPORTATION for December) went far toward fixing the public mind on practical, attainable objectives.

In December, there was the great air cargo meeting of the Society of Automotive Engineers in Chicago—an organization as distinctly separated from the Sunday-supplement type of ballyhoo as the Harvard School of Business Administration is from boogie-woogie music.

From the addresses, delivered to that meeting, which we published in December, and the additional ones which appear in this issue, it is crystal-clear that this business of AIR CARGO is no plaything of hobbyists.

* * *

So far so good—but there is a danger which is already being sensed by some of aviation's best-informed authorities on the real future of CARGO-BY-AIR.

The danger is that the real potential of AIR CARGO may actually be minimized.

There is a risk that, for one reason or another, too much emphasis may be laid, right now, not on what AIR CARGO can do but on what it cannot do.

Unfortunately, the whole fascinating story of what is being accomplished with air transport of cargo by the Army and Navy cannot now be told, for obvious reasons. And some of the ultra-conservatives who have recently sounded off have based their calculations not on the air-planes of the immediate tomorrow but on today's planes and today's costs.

What the story will be, in terms of the

super-cargo planes that are virtual certainties by the time the war ends, may well be another matter. It will surely be a question that will be hotly debated in the months immediately ahead—both in the general press and in these pages.

We of AIR TRANSPORTATION will welcome the fullest and most open possible discussion. The more that is said by those in position to know, the better informed will be the future customers of AIR CARGO transport who are our principal group of readers.

* * *

But this we do say, and we do not think it can be said too strongly:

First, let's have all possible facts, but let them be built on a sound basis.

Second, let's have vision as well—the kind of vision that would have made ours an air-powerful nation before Pearl Harbor, instead of a year later—the kind of foresight that might have brought the war to its turning-point far sooner.

Finally, whatever else we do, let us NOT SELL AIR CARGO AND ITS FUTURE SHORT.

AIR TRANSPORTATION

AIR CARGO • FREIGHT • EXPRESS
MAIL • AIR COMMERCE—DOMESTIC •
INTERNATIONAL

JOHN F. BUDD
Editor and Publisher

Vol. 2 JANUARY, 1943 No. 1

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To win the Battle of Distance

The job in North Africa is a striking example of what American fighting men and fighting equipment are doing, today, on distant battlefronts — supported by supply lines that literally gird the globe. "Armies can never be better than their supply forces."

The growing strength of the United Nations everywhere is a tribute to America's supreme effort in the great battle of distance.

The Army Air Transport Command, the Naval Air Transport Service and the War Shipping Administration have

organized and are directing these amazing movements of men and materials. Due to their combined efforts, huge air and sea fleets are ranging world-wide routes, speeding delivery of the ingredients of victory.

American Export Airlines and American Export Lines, with giant, four-engine flying boats and new, fast cargo ships, are serving in this battle of distance.

AMERICAN
EXPORT *Lines*
Airlines

25 BROADWAY, NEW YORK



In Canada, Freight Flies



IN CANADA, air cargo is really cargo. For evidence, one has only to examine the photographs on these pages. Horses, heavy machinery, boilers, engines, furs . . . and that just starts the store of what Canadian Pacific Air Lines is hauling through the vast reaches of our neighbor Dominion.

AIR TRANSPORTATION's report on Canada's progress comes from youthful, energetic D. B. Wallace, assistant to Canadian Pacific's vice president and general manager. A 1935 graduate of the University of Toronto with the degree of M.A. in transportation, he was on the staff of the Toronto Financial Post and was an administration manager of the RAF Ferry Command before assuming his present post a short time ago—a post as close to Canada's war effort as it is to Canada's amazing progress with CARGO-BY-AIR.

By D. B. WALLACE

*Assistant to the Vice President and General Manager
Canadian Pacific Air Lines*

CANADA'S northern air operators pioneered commercial air cargo commencing in 1926, and, at the outbreak of war, the Dominion's fliers carried the world's record tonnage of air freight.

During the past decade Canada's pilots blazed a network of northern air trails which by 1937 carried commercial air freight totaling 24,000,000 lbs. and even in pre-war 1939 moved 22,000,000 lbs. as compared to 9,500,000 lbs. in the U. S.

It was back in 1924 that the first regular commercial air freight and passenger business in Canada was commenced by the Laurentide Air Services in Quebec. Using planes equipped with skis in the winter and floats in the summer, this pioneer operator carried 78,000 lbs. of freight and 1000 passengers during the first six months of operation. This initial service was followed by similar developments through the West and on the Pacific Coast, but it was not until 1926 that the plane came into its own as an essential means of transport

to outlying Canadian communities and for assistance in opening up mining areas.

In that year a considerable mining development took place in the Red Lake district of Northern Ontario. Prospectors and supplies were flown into the area and the mining-by-air period was born. In fact, in 1926 the only two self-sustaining air transport routes operating in the British Empire were in this Ontario mining field and in Northern Quebec.

These services were on an essentially commercial basis as northern air routes in Canada



HUDSON'S BAY CO., one of the world's oldest business enterprises, leans heavily on cargo planes for current operations. Here baled furs are being loaded into a plane at Ogoki Post, in northern Ontario, for transport southward to market.

have never received any form of Government subsidy. Also it is interesting to note that in Canada, unlike the majority of countries, the plane was first used to service outlying points rather than to connect intercity population centers. As these services were without public aid, it is obvious that only by making them commercially successful could air freight and passenger companies stay in business.

As a result of these developments the airplane today is the spearhead of advance in Canada's north country as it moves vital supplies and personnel in connection with the war program. Already the plane is the prime factor in moving survey parties and equipment for the Alaska Highway, the proposed Alaska Railway and the oil pipe line developments along the Mackenzie River basin. The cargo plane is not something new in this northern country, but rather a part of its very existence and is, therefore, essentially a transport vehicle and not a competitive means of transport.

The mining air freight services commenced on a major scale in 1926 and expanded to the point where, in 1928, commercial aviation in Canada was taking to its wings and several companies were extending activities from coast to coast and planning an attack on the far north. In that year C. H. ("Punch") Dickins,

holder of many Canadian aviation "firsts" and recently operating manager of the R.A.F. Ferry Command at Montreal before he was appointed vice-president and general manager of Canadian Pacific Air Lines in 1942, piloted the first plane over the "barren lands" of Canada's Northwest Territories. In the following year he crossed the Arctic Circle and brought his Fokker monoplane down at Aklavik. This trip to the shores of the Arctic Ocean revolutionized the fur delivery system and over night the airplane became the transport medium, replacing the dog sled and canoe of former years.

The aerial pioneering done by "Punch" Dickins was followed by others in opening up many new routes. In 1930 what is now the United Nations' sole source of radium was discovered in the far north at Great Bear Lake by plane. The richest mercury deposit in the British Empire was also located by the use of the airplane. Another air jaunt by Canada's northern fliers resulted in the location of the North Magnetic Pole. In 1931 the early possibilities of Northern Canada were given world attention by the Lindbergh flight to the Orient. In 1931-32 the airplane developed many new northern mining fields and, by 1933, while flying was still not fully accepted in the more populated southern districts of Canada, the

airplane had become a commonplace factor in the North Country where it was, in many cases, the sole means of transport.

Perhaps one of the most striking examples of the rapid expansion of air cargo and passenger routes in Northern Canada has been that of Yukon Southern Air Transport, now a division of Canadian Pacific Air Lines.

Back in 1934, the pilots of this northern transport air service accepted the challenge of British Columbia and Yukon wildernesses and, by 1937, had a regular service established from Edmonton to Whitehorse near the Alaska border. Today there is a daily service between Vancouver, Edmonton and Whitehorse and Lodestars with stewardesses replace the single-engine ships on skis and floats of the pioneering days. It was this company which furnished the backlog for the recently completed chain of defence airports from the United States border to Alaska, which today is the route for huge U. S. war transports and sleek Army fliers.

Coming east there are northern routes extending upward from Saskatoon to the Arctic. Out of Winnipeg radiates a whole network through the mining areas and on to Hudson



A 1,950-LB. DIESEL engine block takes to the air over Canada.

Bay. In Quebec the plane has long serviced the many communities along the North Shore of the St. Lawrence in winter to Labrador, and in recent years has moved record freight tonnage to great hydro plants being built to furnish power for war industries in the northern portions of the Province.



THIS IS A HORSE—no Pegasus, but a flying horse, nonetheless. It's all in the day's work for Canadian Pacific in Quebec. The animal, of course, must be doped before loading. So far horses aren't fully adapted to being flown on the hoof.



MACHINE TOOLS, BOILERS fly regularly in Canada. Above, one of six boiler units is loaded at Oskelanco, Quebec, for shipment to mines at Lac Dore', Quebec, 125 miles away. Below, a Canadian cargo plane takes aboard a drill steel sharpener—weight, a tidy 4,200 lbs.—for shipment to an industrial destination.



The majority of these northern air companies are now merged into Canadian Pacific Air Lines, the organization which was publicly announced early this year and operates over 100 planes in a nation-wide north-south network from the St. Lawrence to the Pacific and northward to the Arctic. The planes vary in size from single-engine ships to twin-engined high speed Lodestars and revenues now ap-

proximate \$4,000,000 annually. The north-south air routes operated by this newest member of the world's greatest travel system are complementary rather than competitive to the parent company's nation-wide rail routes.

In addition to its war transport operations, now largely geared to moving vast supplies and personnel through Canada's north land, Canadian Pacific Air Lines also operates on

a non-profit basis six Air Observer Schools for training navigators for the R.C.A.F. and also manages five aircraft repair and engine overhaul plants for the Department of Munitions and Supply repairing Air Force aircraft and engines. The total personnel included in transport, training and aircraft repair work comes close to 5000. The Canadian Pacific also pioneered the Atlantic Ferry Bomber Service in 1940 and expanded this operation until it was acquired by the R.A.F. Ferry Command in 1941.

In this review of northern air operations in Canada, it might be noted that originally 75 per cent of revenue came from air freight, about 20 per cent passenger traffic and the balance from air mail. Now that the majority of mining communities have been established, together with the fact that there has been some decline in mining development due to wartime restrictions with a resultant increase in defense cargo and traffic, the ratios have been reversed and about 60 per cent of revenue represents passenger traffic, 30 per cent freight and 7 per cent mail. In connection with air traffic from mining areas, it is a fact that a very substantial expansion took place as a result of the revaluation of the price of gold by President Roosevelt and the 4,200,000 lbs. of freight carried by air in 1933 skyrocketed to 14,400,000 in 1934 largely as a result of the upward price in gold.

Thanks to the pioneering work done by the northern air operators, Canada stands in a favored position with relation to post-war international air routes. It is already established that top-of-the-world air routes, whether moving toward Asia or Europe, will likely cross over northern Canada. The great land



WHITE FOX FURS await loading at Coppermine, Northwest Territory, Canada, for the 1,165-mile flight to Edmonton, Alberta, as Kogmolik Eskimo small fry smile for the cameraman.

areas of the universe radiate from the North Pole like the spokes of a wheel and the Dominion's Arctic lands form the aerial crossroads of the world.

With both of Canada's railways in the air business—the Canadian National with its east-west trans-continental route, and the Canadian Pacific with its north-south air lines—the Dominion should be in an excellent position in the post-war period to control internal service and air transport routes and to develop trans-oceanic connections which are so vital to Canada's position in the world of trade and commerce.

WANTED

EXPERIENCES—Have you transported much material by air? What have been your experiences? When and how was the use of air transportation a distinct advantage? Have you made any unusual shipments? Any requiring unusual preparation? If so—tell us—so we may tell others through the columns of this publication.

IDEAS—We are not seeking inventions—just ideas, such as loading and unloading cargo planes—loading platforms—improvements for Air Terminal facilities—trucks—stowing, etc. If you have any suggestions, let us pass them along.—*The Editors.*

Bullock's Was Plugging Air Cargo Transport in 1926

Los Angeles Department Store's Traffic Manager Recalls Story He Wrote Over 16 Years Ago

ONE of the newest readers of AIR TRANSPORTATION is Fred W. Ashton, head of the Bureau of Transportation of Bullock's great Los Angeles department store. But Mr. Ashton's interest in AIR CARGO is far from new—as the Editors were informed by another reader, H. C. Rausch, manager of National Carloading Corp., Los Angeles, who sent a copy of an article on the subject written by Mr. Ashton in April, 1926.

Because of the great interest which such an article, by a traffic manager, will have for the hundreds of other traffic managers who today are readers of AIR TRANSPORTATION, it is being reproduced in full herewith, as it appeared in *Western Flying* and in the store's house organ, *The Bullock Way*.

Reminiscing over 16 years of avid interest in air transport, and active use of it when opportunity offered, Mr. Ashton comments today:

"We in the retail trade look on the cost of transportation as a vital factor in the selling price of the commodity. The public is buyer-minded and knows a commodity as to its price value. Therefore, the old adage of passing the cost on to the consumer does not always work.

"The cost of air transportation will have to be reduced and no doubt will be reduced nearer to the rail express rate level. Further lessening of the landed cost can be obtained in the use of durable light containers built to meet the adaptable wing space, etc.

"Airports are quite a distance from the center of large cities, and much time is lost between . . . in both sending and receiving. Undoubtedly something will be done to meet this condition. Maybe someone will install an automatic carrier system as now used in large stores for cash carriers.

"Now is the time for airlines to put on their thinking caps for postwar transportation and not wait until the war is over."

With that preface, read Mr. Ashton's views

of 1926 and see how accurately he has anticipated the progress which is now coming into being:

THE Industrial Traffic Manager of today has to keep abreast of the times in all methods of transportation, and to do so he must now give much consideration to Commercial Aviation. His thoughts and studies must lean towards this new method of transportation which is to become a vital part of our modern civilization, and which he cannot afford to disregard with inattention to business interest. The time seems ripe to develop commercial uses of aircraft. Senator Bingham, of Connecticut, a member of the President's Aircraft Board, has introduced a bill to encourage and regulate the use of aircraft in commerce. In France five large companies were operating regular air lines for the transportation of passengers, freight and mail at the beginning of the year 1925. Therefore, Aviation is destined to become an efficient transportation machine.

Time is a great factor in the business of today. Various methods of transportation base their value on time, as the distance from the field of production to the West is considerable; therefore, the less time consumed in covering that distance makes transportation more costly.

We have transportation by water—the slowest; by rail freight, next—and by express, which is the best time made between two given points. Now we are soon to have the much speedier and greatest time saver of all—the Air Service.

This means that the Air Service should be immeasurably greater and proves a costly method of transportation. Before the Air Service can expect to transport a considerable tonnage of merchandise that rate will have to be reduced to a more reasonable basis.

We, of course, cannot expect to have the rate via the air on a comparative basis similar to the other three methods of transportation, but must consider a rate as near as possible to what the traffic will bear.

Yet there are commodities and documents of various description that can afford this high cost of transportation because of time saved. The percentage cost of transportation is small where the value is high. Consider valuable jewelry of special design and new novelties to be placed on sale for a specific date. Special designed gowns from abroad to be copied by the local manufacturer for a seasonable sale. Then the intrinsic value of the commodity does not cut any figure, but time is the determinable factor of an indeterminable value.

Financial documents are of considerable value especially where time governs discounts and exchanges. Ships, papers, customs documents and other papers of a similar nature cannot afford delay.

Valuable parts of machinery are often needed to place idle machines in operation. Each day or even hours of idleness means several hundreds of dollars more than the cost of transportation. Yet we must not lose sight of the fact that we need to be protected against the loss of these commodities or even delay while in transit.

On transportation by water we use marine insurance because of the limited liability of the steamship companies. By rail we use a transit insurance policy for loss and damage over which the railroads have no control. An express insurance to cover their limitation of liability.

The insurance companies will of necessity have to create a policy applicable to aerial transportation for delay, and also for fire and damage caused through collision of any nature and much consideration will have to be given the premium cost.

Discrimination between cities of equal distance should not be tolerated because of two different owned or operated concerns.

The present method of using the air mail from Los Angeles to New York provides for mail transported by train to San Francisco, thence by air to New York for \$384.00 per 100 lbs. while the direct air service will be operated from Los Angeles direct to New

York, eliminating the haul of over 500 miles by train at a charge of \$400.00 per 100 lbs. which seems to me as unreasonable and should be placed on an equal basis.

The Industrial Traffic Manager of today looks towards dependable schedules. Therefore, facilities must be maintained by the air transport to handle the business whether they have any or not.

A favorable time of departure and time of arrival must be the controlling factor in time economy. The business day usually ends about 5:30 P. M. The air transport should leave the same evening thereby eliminating the time lost overnight at the point of origin, and scheduled to arrive at its destination on the business morning, instead of arriving at the close of the business day; causing the commodity to be held overnight for delivery the next day.

When we pay for a time service at a high cost, it is only natural to expect all that is in it. If you will reverse the present air mail schedule time departure from A. M. to P. M. you will note the advantage derived therefrom.

I am told it would necessitate beacon lights over the course, which, no doubt, will be accomplished as time goes on.

New laws governing air transportation will be made similar to laws governing other methods of transportation.

Defining the liability of common carriers in interstate and foreign commerce, the Air Mail Service has proved its time-efficiency and dependability which accounts for the various new mail contracts let.

This is only a beginning of greater opportunities at hand for the business world. Confidence and enthusiasm must be placed in this new great enterprise, and when put on a strict business basis, it will be the most valuable asset of the business world.

RELATIVE OLDTIMERS (old enough, anyhow, to be reading the papers in 1919) recognized a once prominent but long unheralded name in Navy promotion orders issued during last month. It was that of A. C. READ, first pilot to fly the Atlantic. Then a lieutenant-commander, more recently a captain and commandant of the Navy's big air training base at Pensacola, he's now a rear admiral.

Keep 'Em Flying!
Buy War Bonds & Stamps

Post-war planning for Air Freight should begin today

(Cargo planes are already in war service)

From a Speech Delivered by Mr. Juan T. Trippe, President of Pan American Airways System, before the Herald Tribune Forum, November 16, 1942.

"Right now, without further experiment, we can build here in the United States super-transport twice the size of our present ocean Clippers. Although far more efficient aerodynamically than our present Clippers, no new principle in design or construction is involved.

"Such transports can provide twenty-four hour service west from the United States to Chungking, China, or Sydney, Australia. They can provide ten-hour service east from the United States to London, and continue without refueling, to Moscow or Cairo or Baghdad. Southward from the United States, they would provide 24-hour service to Rio and Buenos Aires.

"A fleet of but two hundred such super-transport could carry half a million people to Europe every month; could carry from Central India to embattled China ten times the cargo that ever moved over the Burma Road in its heyday. Two hundred such planes would be a small part of the present aircraft production of the United States."

EVERY facility that Pan American has is now dedicated to winning the war. And so great are the war's demands that our capacities for commercial shipments have been greatly curtailed.

But this situation may change. It will *certainly* change when peace comes.

So we believe that *now* is the time to begin planning for Air Freight by Clipper. Pan American pioneered overseas transport of both passen-

gers and cargo and we have some facts that might interest you. These show that some manufacturers may want to make radical changes in their future businesses to take advantage of Air Freight's greater frequency and far greater speed.

Please address New York office.

PAN AMERICAN
WORLD AIRWAYS SYSTEM



Wings over the WORLD
PAN AMERICAN CLIPPERS

JANUARY 1943—PAGE 15

Air Cargo & World Peace

How the Prime New Tool of War Will Rechart Economic Geography In the Years After the War

By L. WELCH POGUE
Member, Civil Aeronautics Board

In November AIR TRANSPORTATION told of a challenging new forward step in American education—the course in air transport inaugurated this autumn by Dr. Charles J. Kennedy and others of the faculty of Iowa Wesleyan College. One of the most notable features of the course is a series of lectures by aviation and air transport leaders, delivered to the class and broadcast to thousands of cooperating high school students in Iowa, Missouri and Illinois. First address in the series was an inspiring look into the future by L. Welch Pogue, of the Civil Aeronautics Board. AIR TRANSPORTATION presents it here, confident of even greater interest than the address won from its earlier hearers.

MOST Americans are not yet *really* air-minded. They are very much like the man who came into my office in Washington last week after flying back from England on the Atlantic Clipper. The safest way to cross the oceans now, you know, is by air. He considered himself a very air-minded individual. Yet in the course of our conversation he objected to someone's opinion in the most *emphatic* way he knew. He said: "Why, you could no more do *that* than you could fly!"

That expression, I am sure, is familiar to most of us. For centuries, and in all languages, it has denoted something *impossible to accomplish*. In this man's boyhood, before flying was born, that expression was *accurate* and commonplace. Now, it is no longer true, because in aviation we say, "The difficult we do immediately; the impossible takes a little longer."

In reviewing the early history of aviation our engineers always pay tribute to Leonardo da Vinci, the famous Italian scientist and painter of the 16th century. Da Vinci's plans for a heavier-than-air machine were amazingly advanced but he lacked the proper motive power to get off the ground.

In the centuries that followed da Vinci, most people ridiculed the very *idea* of flying.

It was only 39 years ago—December 17, 1903—when Orville Wright crawled into the delicate lower wing panel of the *original* Wright biplane. He lay flat on his stomach, signalled to his brother Wilbur to release his

hold on the wing tip, *then* opened the throttle and skidded down a make-shift bamboo track into the wind, wafting the *first airplane in all the world* upward into the thin air that people said would never hold it. Man at last had flown! "The Air Age" was born.

In 1938 the Congress consolidated various previous efforts to regulate Civil Aviation and gave it a real charter—the Civil Aeronautics Act. Federal regulation today under this Act is exercised by the Civil Aeronautics Authority composed of two agencies—the Administrator of Civil Aeronautics and the Civil Aeronautics Board.

Pre-War Progress Great

The wisdom of Congress in adopting this important law has been abundantly demonstrated. In it Congress said that the Civil Aeronautics Authority in exercising its many duties should encourage and develop an *air transportation system* designed to meet the

present and future needs of the foreign and domestic commerce of the United States, of the postal service, and of the national defense. How could a broader charter be laid by far-seeing statesmen?

In 1941, the last peacetime year, our 21 air carriers took in more than 122 million dollars from all sources and flew over 134½ million revenue miles, carrying 3¼ million revenue passengers. Our airlines formed a transportation network over the United States, Mexico and the Caribbean area, and South America; and extended to Alaska in the Northwest; and across the Pacific to the Orient, the Philippines and New Zealand; and across the Atlantic to Europe and Africa.

Aviation is no longer a barnstorming business; aviation is solid, dependable, and vital to our nation's needs.

CAB's Duties Geared to War

The duties of the Civil Aeronautics Board have been re-directed as necessary since Pearl Harbor. Much of the Board's activities are now devoted to assisting the Government and the airlines in the performance of wartime aviation assignments. A moment ago I said that the Civil Aeronautics Act states that the Board is to keep national defense in mind as one of the things which aviation is particularly well qualified to serve. In this connection our President has said with respect to aviation:

"One fact which stands out is that hardly another civil activity of our people bears such a direct and intimate relation to the national security as does Civil aviation. It supplies a reservoir of inestimable value to our military and naval forces in the form of men and machines, while at the same time it keeps an industry so geared that it can be instantly diverted to the production of fighting planes in the event of national emergency . . ."

As you may know, civil aviation in general and our great airlines in particular have been and are doing a tremendous task in the present war program. Their developed organizations and trained teams of highly skilled and technical personnel presented themselves ready-made as fighting units on the war transportation front which is vital to victory in this global war. In addition, our airlines are carrying on their regular commercial transportation, necessarily reduced in quantity to some extent, thus affording the fast-means of com-

munication between factories and between headquarters and the theatres of war, which is indispensable today when speed on all fronts may well be absolutely essential to victory. Furthermore, apart from their transportation functions, these fine airline organizations are doing a great deal of work in training pilots, mechanics, radiomen, meteorologists and other technical personnel and in performing many special assignments.

Must Look Ahead to Peace

But large problems in aviation loom ahead after the war. Intelligent plans must be laid for the long range future so that all important lessons learned in this war and other principles to be developed therefrom can be put into effect to the end that this nation may contribute its proper part toward stabilizing the world in the future.

To do its part in this connection the Board has established a research and analysis division which will have the duty of developing careful plans for the intelligent handling of the many problems facing us. The American Legion in National Convention in Kansas City less than two weeks ago drew the nation's attention to this important activity of the Civil Aeronautics Board in a resolution calling for full support of this project.

Our future plans must call for a large measure of freedom of the air internationally as we have had *freedom of the seas*. Aviation has *shrunk the world to manageable proportions*. No longer will there be continents or parts of continents isolated or unreachable. Our own United States, which many of us in Iowa and the Middle West were taught to think of as being isolated from the rest of the world, protected by the two greatest oceans in the world, must now face the fact that our isolation is ended forever.

In importance to civilization, the airplane ranks with the *wheel* and the *lever*. It is a vehicle bringing with it great changes in the life and habits of *all people*. Continents are hours apart, instead of *days*; some of our great cities are *minutes* apart instead of *hours*. In the ocean of the air, every city and town is a *port of call* for an airplane from anywhere. Your neighbors are no longer just the people in your county and state; they are the people of the world.

Inland Ports Will Grow

Trade and travel on our merchant air fleet will change the great cities of our country

and of the world. The navigable ocean of air serves *Des Moines* as well as New York and Boston. Already Fort Worth, Texas, a point far inland, is an airline port of entry from Mexico City and points South. Why engage in the costly business of transshipping at the coast-line or border if that is not necessary? What reason is there to suppose that the airplane will not develop *new trade routes and outposts* as did the railroad? Inland country now becomes accessible to all; and *urban centers now great*, enjoying the advantages of being distribution bottlenecks on land trade routes, would do well to keep an eye on the sky.

Already South America has skipped from the mule and the llama to the airplane, omitting the railroad and automobile ages. Transportation that formerly required *months*, can now be completed in a few hours and in much more comfort. Travel in Alaska skipped from the *dog team directly* to the airplane. A few years ago a dog-team trip from Fairbanks to Nome was the *only* means of communication and cost between \$1,000 and \$1,500 per person and took from 20 to 30 days. *By air* it now takes *four hours* and costs \$78.

The airplane is recharting world geography. Only a globe can show the world in its true proportions. Accordingly all maps on flat paper are guilty of some distortion. The Mercator projection map which most of us know best shows the world spread out flat and makes you think a direct route from Washington to the Philippine Islands would be just north of Hawaii and south of Midway Island. The fact is that the shortest route by air from Washington to the Philippine Islands is over the Great Lakes, over the Northwest Territory of Canada, through a portion of the Arctic Circle north of Alaska, down over the eastern end of Siberia and Vladivostok, and *straight on into Manila*. The shortest airline course from *Japan* to the *Canal Zone* is along the Aleutians, down the West Coast of Canada and over Denver, approaching the Zone from the Atlantic Ocean side. All this is almost as hard to believe now as it once was to learn that the World is round when people had been taught that it was flat.

Most important of all, aviation will make us neighbors to everyone when peace comes. It is well within the range of probability that it will soon be as easy, without undue expense, to step aboard an airplane and spend a two weeks' vacation in South America, Europe, Asia, Africa, Alaska, Australia or even a *South Sea Island*, as it was a few

years ago to go from Iowa to California or New England for that *same* vacation. No longer will it be only for the very rich to speak with sophistication about London and Paris and Rio.

Aviation will broaden our understanding of *all the world's people*. We will have the means of rubbing shoulders with *everyone* from *everywhere*. This is important. This is new. The "Air Age" will make possible the extension of the good neighbor policy to all people. It will change civilization and, I firmly declare, it will contribute mightily toward the cause of an enduring peace.

Phinney Heads Chicago District for Braniff

Robert T. Phinney has been named Chicago district traffic manager for Braniff Airways, Charles E. Bearl, Dallas, traffic vice president,

has announced. Phinney will immediately replace Tom Fagan who has resigned to accept a commission in the Navy.



Robert Phinney

Phinney joined Braniff Airways in April 1939, as a traffic representative in the line's Oklahoma City office. He spent six months in Houston as city traffic manager before becoming district traffic manager

at Oklahoma City. From January to March, 1942, he was assigned to the Ferry Command at Hensley Field, Dallas, as a civilian assistant to Col. T. D. Ferguson. In March he was given a foreign assignment in connection with Braniff Airways' foreign army cargo operation from which he has recently returned.

Phinney is a 1938 graduate of the University of Colorado.

LAYMEN ON AIR matters who spy the daily stories in the press, telling of fatal accidents in the Air Forces, will be surprised at the facts on actual accident *rates*. The rate per 1,000 hours flown is actually lower now than the average for the 10 years before Pearl Harbor, according to Robert A. Lovett, Assistant Secretary of War for Air.

Are Gliders the Answer?

Waco's Riggs Weighs the Factors, Concludes A Vast Opportunity Exists in Motorless Cargo-Planes

A. L. RIGGS has been the sales head of one of the country's leading builders of Army troop-carrying gliders—a company that bears a name familiar for years to every private flying enthusiast for its small and medium-size planes. The views he expresses here for the readers of *AIR TRANSPORTATION* are his own, and do not necessarily represent the views or official policy of the Waco Aircraft Co.

By A. L. RIGGS

*Sales Manager, The Waco Aircraft Co.**

ONE of the foremost questions in the minds of our great leaders today, both business and state, is "What miracles will the post-war period reveal?" It goes without saying that even the most vivid imaginations have not yet touched the scope made possible through the use of cargo-carrying gliders.

In these days of production miracles—as the aviation spotlight plays to a great extent on cargo-carrying planes—surprisingly enough, comparatively little is mentioned of cargo gliders. Much publicity is devoted to unproved schemes of producing preponderous cargo carrying multi-motored giants of the air that are capable of transporting scores of cargo tons or passengers hundreds of miles, but after all arguments are condensed, is this the answer to the most practical form of air transport?

Consider, for example, the present standard of the airlines and one of the Army's favorites, the Douglas DC-3 or C-47. The payload is approximately two tons. However, that same cargo ship, in addition to a moderate load of its own, can tow as many as three Waco CG-4A 15-place gliders, each with a payload of one and one-half tons.

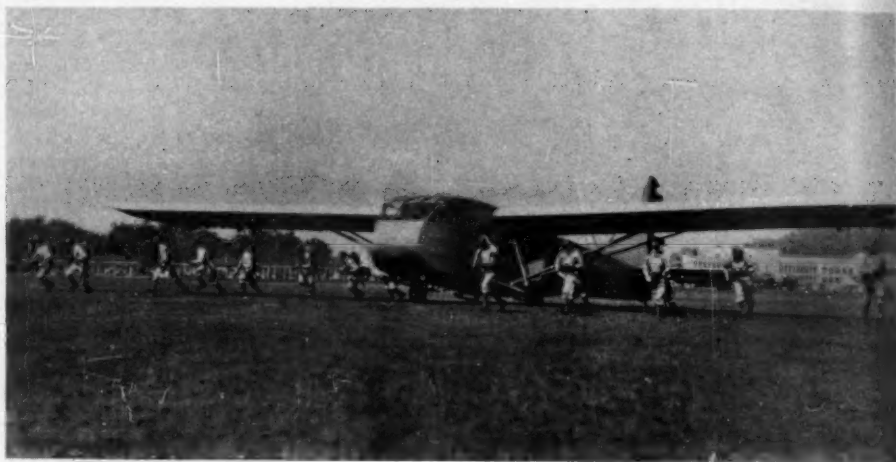
At the same time it must be borne in mind that to date no airplane has been designed or produced primarily for the purpose of towing a number of huge gliders. It is not difficult to visualize a medium-sized twin-engine ship with today's 2,000-horsepower engines towing eight to 10 gliders in the category of the Waco CG-4A or a somewhat smaller number of

larger gliders that are sure to come as glider interest progresses and our engineering capabilities advance by experiences gleaned from present-day production. Glider interest is being stimulated daily by demonstrations of today's so-called "big" gliders that are, in reality, still in their infancy.

The U. S. Army Air Forces now are fully cognizant of the value thousands of such craft hold for use wherever fast transportation of large loads is urgently required. The present day 15-place glider is now being manufactured under the engineering guidance of the original designers by leading aircraft manufacturers from coast to coast. It is a relatively safe wager that all the tools, knowledge and experience now being utilized will not be scrapped after this war is ended. What is more natural than that the manufacturers now engaged in their fabrication will continue with improved commercial designs?

Immediately after the close of this war, it is predicted by well versed authorities, growth of commercial air transport as well as private flying will parallel the vast expansion of the

* Now on leave, since writing this article, and a Second Lieutenant, U. S. Army Air Force.



NOT A FREIGHTER, but illustrating the possibility, is this Waco CG-4A glider, showing "invasion troops" emerging from it in Army maneuvers.

automobile subsequent to the last war. While present methods of land transportation are never expected to be replaced, of necessity they will be augmented greatly by the speed and convenience of air shipping. Such shipping both intra-continental and inter-continental will surpass any limits possibly conceived at the present time. Business pioneers already are visualizing and planning a gigantic air transport system bonding the Americas and linking other continents.

The chief reason the cargo-carrying glider does not occupy a more prominent place in the mind of the average citizen is that Mr. John Citizen hasn't had the opportunity to see it demonstrated. Daily, however, he sees powered aircraft grow larger and it is only natural for him to imagine that he will some day witness giant airliners transporting hundreds of passengers and scores of tons of cargo overnight to a point thousands of miles from its origin.

As the war progresses, Mr. John Citizen is going to see more and more gliders being towed overhead by single medium-sized airplanes until several huge gliders carrying tons of cargo each will be commonplace. The secret of cargo gliders lies in the common fact that any present-day airplane could more than double its load if it could only take to the air with such a load. In towing a glider from a field, the glider takes off first then, at the critical moment, noses down so that its drag is momentarily removed from the towing ship.

Once the cargo ship is in the air, it can tow several times its own maximum load in gliders. With the pickup of gliders by an airplane flying overhead at a hundred miles per hour or more now a reality, the limit placed upon its load depends entirely upon the towing ship's available horsepower.

Then, too, numerically great crews now necessary to operate the large ocean clippers could be dispensed with. A pilot and co-pilot at the controls of the powered ship and one pilot for each of the gliders constitute the sole flight personnel requirements of a glider train. Without stopping the entire train, any number of loaded gliders can be released over a given airport and the same number prepared and waiting can be picked up and carried to their destination. The landing gliders can then have their cargo transferred, be reloaded, prepared for the next towing airplane, and the process can be repeated.

Glider even as they are fabricated today are comparatively low-priced and repairs simple. The Waco CG-4A, for example, is built and assembled in sections. As a demonstration of the construction simplicity, the sections are at present fabricated by hundreds of small sub-contractors in enormous quantities. Former piano manufacturers, furniture factories and small shops everywhere are potential glider parts manufacturers. This solves a major production problem when shipped to a central point for assembly. By the same token, when a glider is damaged in flight or on the

ground, it is only necessary to have the damaged section removed and a replacement section installed. Being necessarily light in construction, manpower for maintenance constitutes only a minor problem. There is little time wasted while the glider is repaired, loaded and ready for the next tow plane.

All points considered, there is no reason for not believing that for every ton of cargo transported by gigantic multi-engine cargo air carriers, the same amount can be moved possibly as swiftly and much more economically by glider train.

During the past 15 years, air express rates have been reduced from \$15 for five pounds, coast to coast, to a present cost of less than \$5. With present air transport facilities, this price can be reduced very little. However, by using gliders, whose initial costs even now are only a small fraction of that of the present-day airliner, even this transportation cost could be slashed unbelievably.

The rapid growth and expansion of airliners, feeder lines and inauguration of glider flight trains to be experienced during the postwar period will demand mass production heretofore

believed unattainable. As mass production reduces the cost of gliders so mass transportation will reduce the rates of air express and air freight. All first class mail by air, long a dream of those in aviation, fast shipments of perishable foods and produce, quick transportation of vital parts required in industry are no longer a dream. They are now being planned and glider trains are the logical basis for air transportation economical enough to permit the fulfillment of those plans.

EDWARD G. BERN's appointment as sales manager for Hughes Aircraft Co. is announced through Howard R. Hughes, president of the company. Bern, veteran of World War I, has an extensive sales and aviation background. On his return from France he organized and was first president of the pioneer Kansas City-Wichita Airways. After selling Kansas City-Wichita he became President of Columbia Airlines, operator of a Detroit-Toledo-Dayton-Cincinnati-Louisville-Evansville-St. Louis route. More recently he has been with American Airlines, as regional vice-president.

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AIR-PORTATION NEWS



Two of aviation's top thinkers and planners met when Welch Pogue, chairman of the Civil Aeronautics Authority, presented the American Museum of Safety's Arthur Williams Memorial Award to Juan Terry Trippe (right), president of Pan American Airways. For more on Mr. Pogue, see page 16; on Mr. Trippe, see below.

Pan Am Makes News Again

Trippe Wins Award, Tells a Story

Scheduled overseas air transportation, despite its comparative youth, took its place this week, from the development and safety standpoints, alongside the oldest forms of transport when the Arthur Williams Memorial Award was presented to Pan American Airways by the American Museum of Safety.

The presentation was made by Chairman Welch Pogue of the Civil Aeronautics Authority and was accepted by J. T. Trippe, President of the airline, "on behalf of the company's

23,000 employees," at a dinner at the Metropolitan Club in Washington on Dec. 8.

Pan American's Gold Medal and accompanying plaque read: "For pioneer service insuring utmost safety in overseas flight." In accepting the award, Mr. Trippe emphasized that the company's record never could have been achieved without complete team work on the part of everyone in it and who are now serving in more than three score foreign countries throughout the world. Flight engineers,

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radio operators, stewards, meteorologists, the unsung ground mechanics and above all, the highly trained Masters of Ocean Flying and their brother pilots had to combine their efforts and demonstrate team work during the company's 15 years of history to achieve the technique of overseas operation.

To Pan Am's famed Trippe, the occasion provided an opportunity for a stirring account of the far flung system's air achievements—many of them in the field of AIR CARGO—as had the earlier New York *Herald Tribune* Forum, where he had been one of the principal speakers.

Significant Trippe excerpts, forming a vital sequel to AIR TRANSPORTATION's own summary of Pan Am's work with CARGO-BY-AIR, published in November

"Before Pearl Harbor, we had a network of domestic air lines better than any in the world. We also had in the overseas system an air fleet which exceeded any foreign-flag system in number of ships in operation, miles flown and passengers carried. When war was declared, this overseas air fleet was providing service to every country in South America, to Alaska, across the Pacific to China, Singapore and Australasia, across the North Atlantic to Portugal and the United Kingdom and across the South Atlantic to Africa.

"Even before Pearl Harbor, Pan American, working with our Army and the British, had developed a modern airway across the continent of Africa. Airports had been hacked out of jungles and built on desert wastes. Camels furnished part of the transportation. Native Africans were employed as artisans. Malaria and tropical diseases were rampant. But these plagues were met and conquered by American doctors and American sanitation, just as American engineers had conquered the jungle.

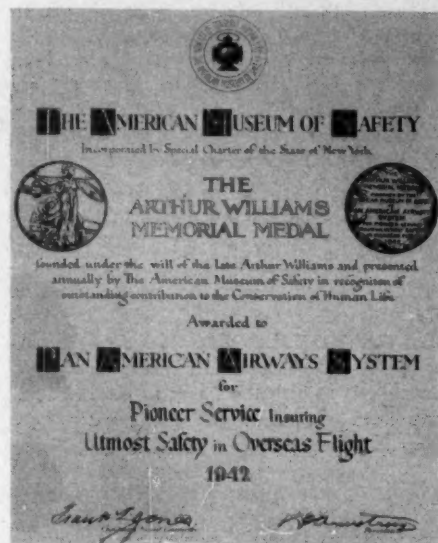
"After Pearl Harbor, this American merchant fleet became over night an important factor in our war effort.

"Civilians were evacuated from Wake and Midway Islands.

"Four days after the Japs laid siege to Hongkong, our system's transports snatched away from the Japs several hundred important Chinese marooned there when the crown colony was attacked four hours after Pearl Harbor. The Japanese lines had already surrounded

Kai Tak, Hongkong's airdrome. Our planes were able to do the job only at night. They did it under fire and in the driving rain. As the planes approached the field, Chinese coolies were rushed out to mark the runway with the pale flicker of kerosene lamps—but the job was done.

"For many months the Clippers carried supplies to General Chenault's famous Flying Tigers of the A. V. G. squadron. Later, our



Pan Am's Latest Prize

system's aircraft aided in the evacuation of Burma, flying over jungles and mountain ranges in the worst weather—the monsoon season. Under the pressure of dire necessity, one transport, built to carry 21 passengers, actually took out 74. But not a life was lost during the entire evacuation.

"The route across Africa has been a lifeline to Egypt, the Middle East, Russia, India and China. Today it is aiding our American and Allied forces in the grand job they are doing in mopping up Africa. There are many other thrilling incidents—deeds performed by our merchant airmen that will live forever in the records of American civil aviation—deeds comparable to those of our brave merchant seamen.

"But the main job of air transport overseas

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is, day after day, to get priority passengers, cargo and mail through in safety and on schedule. This is the job being done to help win the war by Pan American personnel in more than 60 foreign countries and colonies. At their stations on the ground and in the air, they are carrying on with ceaseless attention to every vital detail—as professionals should.

Pacific Mileage Far Up

"Across the Atlantic we are already operating many times more flights than before the war. In South America, schedules have been increased despite the unavailability of new equipment. In the Pacific—even with Wake, Guam and Manila in enemy hands—we are flying substantially more mileage than before Pearl Harbor.

"In past months other civilian air-transport services have joined in the averseas air-transport effort. American Export Airlines are operating wartime service across the Atlantic. Our large domestic companies, whose schedules within the United States have been curtailed, are utilizing their organizations under arrangements with the Army to provide additional service. These civilian services have been augmented by overseas air-transport service operated by the personnel of the Army and Navy. The Army and Navy are not only flying converted bombers but are also expanding their operations with four-engine transports.

"Right now, without further experiment, we can build here in the United States super-transport twice the size of our present ocean clippers. Although far more efficient aerodynamically than our present Clippers, no new principles in design or construction are involved. Such transports can provide 24-hour service west from the United States to Chungking, China, or Sydney, Australia; 10-hour service east from the United States to London, and continue without refueling to Moscow or Cairo or Bagdad. Southward from the United States, they could provide 24-hour service to Rio and Buenos Aires.

"A fleet of but 200 such super-transport could carry half a million people to Europe every month; or carry from central India to embattled China 10 times the cargo that ever

moved over the Burma Road in its heyday. Two hundred such planes would be a small part of the present aircraft production of the United States. Such a fleet, however, could contribute immeasurably to the successful prosecution of the war. In the words of President Roosevelt, 'Civil aviation is the backlog of military aviation.'

"The British, with the experience of three years of war behind them, have come to appreciate the contribution which civil air transport can render in their war effort. They have continued to expand their civil air-transport system. In so doing, Britain is not only contributing effectively to the war effort but also has organized its civil aviation to be in a position to meet whatever conditions, commercial or otherwise, the post-war world presents.

Post-War Outlook

"Let us consider the situation that will confront the merchant air fleets of all nations in the post-war world. Great Britain, France, Holland, Italy, Germany and Japan—in fact all foreign countries that have international air transport systems—have already merged their overseas air transport into great single monopolies. Each company, as a matter of national policy, is supported at home by its own government and diplomatically abroad by its foreign office. British Airways, the Lufthansa, Air France and Dai Nippon are the chosen instruments of their respective governments in world air transport. Many of these great systems are completely government owned. All of them enjoy the exclusive support of their respective governments in overseas air transport. A few of them, such as Lufthansa, may have their wings clipped in the peace treaty, but the great majority of these great systems will carry on to spread their post-war networks over the trade routes of the world.

"Every American wants our civil aviation to contribute most effectively to the war effort. Likewise, every American wants our civil aviation to be ready to meet its responsibilities in the post-war world. The United States is entitled to an overseas merchant air fleet second to none.

"Such a merchant air fleet would be the

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most effective medium for carrying out our share in the job of policing the post-war world so that never again can a mere handful of aggressors run amuck.

"Does any one imagine that, without England's great merchant marine of the seas, the peoples of such distant points as South Africa and Australia would today be speaking English?

"Nothing has been truer in the past, nothing will be truer in the future, than the fact that those nations which operate the trade routes of the world will give direction to the whole course of civilization.

"Does America want to carry on the fight for the liberty of the common man begun in the days of '76? Does America want to do her share in building a better world after this war?

"If so, we must begin planning now for an overseas merchant air-fleet system of global scope—an air-transport system not of luxury liners but one that will bring world travel within financial reach of the average man everywhere—an air-transport system that will guarantee survival of the free way of life all over the world and seal forever the doom of those international pirates who destroy foreign trade—but who never build it up."

American Moves Three To Higher Portfolios

American Airlines, Inc., announces promotions through Charles A. Rheintrom, traffic vice president:

B. E. Sherwood has been named New York representative of air mail, express and freight, succeeding Girard M. Curry who has assumed the duties of eastern superintendent of air mail, express and freight. Sherwood joined American as a ticket delivery boy in September, 1937. Subsequently he became a reservations clerk until August, 1940, when he was transferred to Newark as a traffic representative and was made traffic manager.

Raoul H. Nehr has been appointed Newark traffic representative. He joined the company in 1940 as junior reservations salesman. Subsequently he became a ticket and reservations agent until October, 1942, when he was made traffic representative in New York.



Adding feminine pulchritude to the ancient profession of celestial navigation, Braniff Airways has employed Dorothy Mallett as an instructor in navigation at Dallas. Under the direction of Richard W. Logan, Braniff training superintendent, she will teach celestial navigation and flight planning to company student co-pilots and Army co-pilots assigned to Braniff Airways for advanced training. She has earned government licenses to instruct in parachute practices and in navigation and holds air school certificates as a celestial navigation instructor.

CLIFFORD S. PEARSON, since 1937 in the cargo department of United Air Lines, has been made eastern cargo supervisor.

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To enable airlines to move heavy air express volume expeditiously, Air Express Division of Railway Express Agency is sending this poster (10 x 14 inches) to thousands of U. S. shippers, urging them to "Ship When Ready" and thus avoid possible end-of-day overloads on planes. Shippers were asked to route this poster to shipping departments as a reminder to forward Air Express as soon as ready.

Chicago & Southern Ups Nooney and Bolander

Appointment of John A. Nooney as treasurer, and Robert H. Bolander, Jr., as acting general counsel of Chicago & Southern Air Lines has been announced by President Carleton Putnam. Both will assume duties of A. Culbert, vice president-general counsel, who becomes associated with American Airlines as vice president.

Nooney, a certified public accountant, was associated with Touche, Niven & Co. of St. Louis, auditors for the airline.

Bolander joined Chicago & Southern in 1935 as assistant to Culbert. He was associated with a prominent San Francisco law firm.

Seven Airlines Bidding For Caribbean Routes

Still pending at AIR TRANSPORTATION's January presstime were applications before the Civil Aeronautics Board for permission to establish regular passenger and cargo service in the Caribbean area. Two were U. S. lines, five foreign.

The seven: Eastern and National, U. S. airlines; and TACA [see page 30]; British West Indies Airlines; KLM, the Royal Dutch lines (see AIR TRANSPORTATION, December 1942); Expreso Aero Inter-Americano S.A., a new Cuban company, and Compania Nacional Cubana de Aviacion S.A.

Hearings were held through most of November, though decisions have not yet been announced. The area is one in which Pan American Airways already holds an important, if not dominant, position.

Meanwhile, an application for establishment of an air service between New York, San Juan and Ciudad Trujillo has been reported asked from the Dominican Republic by International Airways Inc., owned by the Atlantic, Gulf & West Indies Steamship Lines. The ACWI affiliate also hopes to establish a New York-Havana-Mexico City service, it is reported.

Kaiser's Story To Be Told in February

Some time in February, Master Shipbuilder Henry J. Kaiser will be telling the nation the details of his forthcoming giant cargo planes, he declared in New York in December.

Despite the millions of words written and spoken about the Kaiser cargo plane, little of a factual nature is generally known about it. The only illustration of it—that an advance drawing—was published by *Time* and AIR TRANSPORTATION, on the latter's October 1942 cover.

"We are planning," said the west Coast builder, "to build these planes for permanent use. They must not be confused with passenger ships: they will be designed to carry heavy freight and we are building them to produce the greatest possible mileage at the lowest possible cost."

AIR-PORTATION NEWS

Braniff Joins Lines Giving U. S. Customers Air Service to Mexico

Another international airline between the U. S. and Mexico will soon begin operation, T. E. Braniff, of Braniff Airways, has announced. The Civil Aeronautics Board has awarded Braniff a permanent extension of service between San Antonio and Laredo which, integrated with Braniff's Chicago-Texas service now in operation and with Laredo-Monterrey-Mexico City service operated by Compania Mexicana Aviacion (subsidiary of Pan American) will provide the new service. Laredo is not now served by a domestic airline.

Braniff Airways is ready to inaugurate service immediately. But it is current practice of CAB in awarding new routes under war-time conditions to provide they not become effective until the Board notifies the airline that the national defense no longer requires a delay in inauguration.

Pan American and its subsidiary and Braniff have already agreed to an interchange of equipment whereby through, one-ship operation will be effected subject to approval of CAB.

The new route will be a significant aid to the war effort and its ally, Mexico, Braniff declared. War production plants and military establishments throughout the country will be provided with a new direct mail, express and passenger service.

The decision is the result of an application originally filed by Braniff in February 1939.

United's Pilot School Is Shifted to Denver

Transfer of United Air Lines' pilot-training school from Cheyenne to Denver has been announced by Walter J. Addems, director of flight operations.

Involved are 25 instructors and office personnel, 12 maintenance men, a continuous enrollment of 100 to 125 pilot students, 10 training planes ranging from single-engined primary types to large multi-motored air-liners, and various other equipment.

Ex-Curtiss-Wright Officer Receives Silver Star

For distinguished service while assisting in directing the first Allied attack on an enemy airfield near Oran, Algeria, Col. John S. Allard—former vice president of Curtiss-Wright Corp. in charge of its export sales division and ex-director of Wright Aeronautical Corp.—has received the coveted Silver Star from Lieut. Gen. Dwight Eisenhower, according to dispatches from the North African theater of war. Colonel Allard was one of five colonels serving under Maj. Gen. James Doolittle, also a former employee of Curtiss-Wright, to be cited for meritorious service. Only two received the Silver Star.

Colonel Allard was granted a leave of absence by Curtiss last July. He is a veteran flier of the First World War in the Signal Corps.



Col. J. S. Allard

News dispatches explaining the action at Oran told how the former Curtiss-Wright executive exposed himself to French air attack and artillery fire with great risk to his personal safety during the invasion. Although serving as an administrative officer for the Twelfth Air Corps under General Doolittle, Colonel Allard "contributed qualities of leadership that aided materially the success of the American occupation of that area," said a dispatch to the *New York Sun*.

BOOKS

AMERICAN AVIATION DIRECTORY, 1942-3 Edition. The standard reference guide of aviation officials and companies of the U. S., Canada and Latin America, published twice a year. It contains valuable information about manufacturers, accessories, and parent and holding companies, a section devoted to the Government, and another that deals with air transportation. Copies may be obtained from American Aviation Associates, Inc., American Bldg., Washington. \$5.00.

Do Not Sell Air Cargo Short



SAE Journal Photo

Commander C. H. Schildhauer, Naval Air Transportation Service; Ray D. Kelly, United Air Lines Transport Corp.; Colonel Harold R. Harris, assistant chief of staff, Air Transport Command, Army Air Forces. Mr. Kelly was general chairman of the meeting and to him goes major credit for planning and production of the program at the Chicago Air Cargo Meeting of SAE, reported in the December Air Transportation and on the pages that follow.

"Many uses for air cargo will arise," United's Kelly told the meeting, "about which we have no information or knowledge at this time. It is bound to increase in importance and my admonition is: 'Don't sell air cargo short.'"

Air Cargo's World to Come



Concluding Air Transportation's Special Report on Chicago's SAE Air Cargo Convention

Last month AIR TRANSPORTATION gave its readers the first published addresses delivered at the Society of Automotive Engineers' meeting on Dec. 8 and 9 in Chicago—the meeting that, as Business Week put it ten days later, “held for two days the undivided attention of what was probably the heaviest brainpower ever concentrated on the problem” of postwar AIR CARGO transportation.

This month, AIR TRANSPORTATION concludes the special report with virtually complete transcripts of addresses not available when the December issue went to press. Portions of the meeting not covered in either issue are, in the main, those dealing with highly technical phases of airplane design, manufacture and operation in which general interest is naturally limited.—THE EDITORS.

A Special

TRANSPORTATION
Report

Six and a Half Times U.S. Air Cargo Total Carried in Latin America

Commerce's Van Zandt Measures Record in A Challenging Summary For SAE Air Cargo Gathering

OATI Director Van Zandt's address at the Chicago meeting was an eye-opener to many who attended, and will be a bigger eye-opener to the majority of the readers of AIR TRANSPORTATION. In it, he points to startling accomplishments in the republics south of us in the transport not of "trick" or emergency freight items but of solid, bread-and-butter industrial and commercial cargoes.

True, much of this has been made possible by the relative absence of modern surface transport in these countries—and Mr. Van Zandt emphatically points out that the success of CARGO-BY-AIR must rest in the future on a solid economic basis of better service for lower cost than available competitive means of transport offer.

By J. PARKER VAN ZANDT
*Director, Office of Air Transport Information
Department of Commerce*

AIR TRANSPORTATION has developed to impressive proportions in Latin America and AIR CARGO has played an important part in its growth. The airline network is two and a half times greater than in the domestic U. S. There are some 44 operating companies with 750 scheduled stops, as compared with 18 air carriers in the U. S. with some 260 stops.

The intensity of operation over the Latin American network naturally reflects the substantially lower population density. Thus, the total mileage flown in 1940 was only about one-quarter that of our domestic airlines and the passenger traffic about one-sixth. But the pounds of cargo transported by the Latin American system as a whole was some six and a half times greater!

To understand the reason for this emphasis on AIR CARGO, it is important to know something of the background:

Latin America has an area some two and a half times larger than the U. S., or roughly 8,000,000 square miles. Of the 10 South American republics, one alone—Brazil—is bigger in area than the U. S. In every country, almost without exception, nature has placed serious obstacles to surface transportation.

From northern Mexico 7,000 miles to Cape Horn, a mountain wall runs almost like a spinal column, interposing a barrier to east-west travel. Whether jungle-covered and relatively low as in Central America, or snow-covered and marked by peaks rising to above 20,000 feet, as in Ecuador, Peru, Bolivia, Argentina, and Chile, this ever-present barrier is Latin America's most prominent feature.

Elsewhere, great tropical jungles, vast

swampy river basins and barren deserts add further obstacles to ground transportation. Surface lines of communication, for the most part, reach only a little way inland from the coast. Much of the hinterland still remains largely undeveloped and inaccessible, due to lack of adequate transportation facilities.

This combination of topographical obstacles and limited surface communication has given the airplane unequalled opportunity for usefulness. As a consequence, *airline mileage in 13 of the 20 republics already exceeds railroad mileage.*

Mainline Advantages of Air Travel

Even on principal trade routes between neighboring capitals, the airplane offers impressive advantages. For example, on the east coast, from Buenos Aires to Rio de Janeiro, surface travel requires six days against seven hours by plane. From Rio inland to Asuncion, capital of Paraguay, it is a 10-day ground trip; by air, six hours.

On the west coast, from Lima 1,650 miles to Santiago, the surface trip requires about six days against 10 hours by air. Brazil and Colombia have a common frontier on the Amazon. But to travel from Bogota to Rio requires some three weeks, against present roundabout air schedules of three days. On a more direct route, the trip could be flown in a day or two at the most.

In brief, travel time between the capitals of our Latin American neighbors which has heretofore taken from one to three weeks has now been reduced to one to three days.

Off-Line Advantages

Once one leaves the main trade routes the comparison is still more startling. Not only is surface land travel often incredibly slow, irregular and uncomfortable, but at times even dangerous. Further, the gross cost is sometimes higher than the corresponding airline fare.

Consider, for example, the 85-mile route between Cuenca and Loja in southern Ecuador, where a link of the Pan American Highway is now being pushed to completion. Cuenca is an important source of Panama hats, and Loja is an agricultural and textile center. To journey between the two towns takes five days by mule over a cold and wind-swept trail with little or no provision for overnight lodg-



J. Parker Van Zandt

ing. Mule hire alone is \$10, exclusive of shelter and food.

PANAMA makes the flight three times a week in 45 minutes and charges \$12. Thus, even at a rate equivalent to 14½ cents per passenger-mile, the airline has little surface competition.

From Lima to Iquitos, on the upper waters of the Amazon basin in the northeast corner of Peru, the air distance is some 735 miles. With modern equipment a four-hour airline schedule is entirely practicable (although no direct service is presently operating). Other than by plane the normal mode of travel between Lima and Iquitos is by boat¹ through the Panama Canal, around South America and back up the Amazon River, an 8,000-mile journey involving 30 to 40 days. An alternative overland route is the difficult Pichis Trail, employing successively automobile, mule, balsa raft, and launch, and requiring some 25 to 30 days.

The most astonishing example of potential aerial time-saving has to do with the Acre Territory in the northwest corner of Brazil. This is the section purchased from Bolivia during the rubber boom, because of its potential rubber resources, by the famous Brazilian Foreign Minister, Baron Rio Branco.² From

¹ The boat fare is approximately \$450, which on the direct air route would be equivalent to about 60 cents per passenger-mile!

² There is also a possibility that this region may eventually prove to be a source of oil, a natural resource in which Brazil is almost totally lacking at present.

this territory and adjoining sections of Peru and Bolivia come the finest grades of native rubber, known to the trade as "upriver fine."

To travel from the town of Rio Branco, at one end of the Acre Territory, to Cruzeiro do Sul, at the other, is a four-to-six-months' journey by canoe and balsa raft down the Rio Purús, along the Amazon and back up the Rio Juruá. The airplane can make the trip in comfort in an hour and a half!

Small wonder the Rubber Reserve Corporation in recent months has turned to aircraft as the logical means of expediting rubber production throughout the entire Amazon Basin.

TACA Leads in Central America

In Central America the Transportes Aereos Centro-Americanos, better known as TACA, founded by Lowell Yerex, a New Zealander, has been the outstanding exponent of air freight transport. Begun in 1931 with one small airplane, little financial resources, and no government subsidy, the company has grown in the short space of eight years into an international transport system of first importance to the republics north of the Canal.

At the close of 1940 TACA operated into 236 landing fields, of which 85 were scheduled airports and the remaining 151 located at points to which the company offered charter or flag-stop facilities.² The flight equipment in the spring of 1941 consisted of 50 planes, of which 26 were Ford trimotors and five were Lockheed 14's. Modern and extensive maintenance shops are maintained at Tegucigalpa, Honduras, and at San Jose, Costa Rica.

During the last five years, 1937 through 1941, TACA has transported some 93,000,000 lb. of express and freight. This is over three times the total carried by U. S. domestic air carriers during the same period, as shown in Table I (*top of next column*).

TACA's income has been derived primarily from freight. During 1940, for example, over 60 per cent of its total revenues came from this source, as compared with less than 3 per cent earned by U. S. domestic air carriers from the carriage of express during the same year. TACA's revenue from mail was some 5 per cent of its total and from passengers 31 per cent.

² CAB Docket 491, April, 1941, Exhibit 66. The average distance between the airports was said to be about 50 miles.

TABLE I
Express and Freight Transported
During Past Five Years

	TACA (pounds)	U. S. Domestic Air Carriers ^(*) (pounds)
1937	11,347,000	4,294,000
1938	15,373,000	4,727,000
1939	20,034,000	5,851,000
1940	27,817,000	7,700,000
1941	30,161,000 ^(*)	11,160,000
5-year Total	104,732,000	33,732,000

^(*) This is the unduplicated poundage, as reported by the Railway Express Agency under the uniform air express agreement. Express figures reported by the Civil Aeronautics Board, which are 55 per cent to 75 per cent higher, include considerable duplication due to shipments traveling on more than one airline. In April, 1939, the average distance a shipment was transported was 1,047 miles; but the average distance per airline is approximately 550 miles. On TACA it is probably nearer 150 miles.

The company has never received a direct government subsidy and its payments for carrying mail have generally been at the usual rate previously paid for the transportation of mail by burro. Almost all local mail in Central America moves at the same rate by air as by surface means, a system introduced several years before the much publicized British "all-up" plan.

The secret of TACA's rapid rise lies principally in the hauling of bulk freight cheaply, in a country where surface transportation is difficult. Freight which formerly required, for example, two weeks to move from the north coast of Honduras to Tegucigalpa, the capital, a distance of approximately 150 miles as the crow flies, is now flown in less than two hours.⁴ Unit loads which on many routes were formerly limited to some 100 pounds per mule-back can now be increased to 4,000 or 5,000 lbs. or more.

Vast Range of Goods Hauled

Among the articles which have been transported by air are refrigerators, radios, barbed wire, galvanized iron, tobacco and cigars, lumber, dynamite, gasoline and machinery, locomotives, chemicals, Diesel engines, oil, steel balls, all types of mining machinery, donkeys,

⁴ Tegucigalpa is unique in that it is one of the few national capitals in the world not served by a railway.



Loading express cargo in a TACA Lockheed 14. The bundle in the foreground contains native hats, manufactured in El Salvador and destined for Honduras. The box going into the forward hatch contains work clothing.

corn, beans, peas, fruits, vegetables, cheese, fresh butter, meat and all kinds of food supplies.⁵

TACA introduced the principle of *deferred freight*, at rates *one half (or less) air express rates*. The backlog of freight accumulated under this plan permitted the company to keep its planes loaded close to capacity on almost every run. This is how the so-called "butter-and-egg" run from Tegucigalpa to La Ceiba, on the Caribbean Coast was developed.

Formerly this port town had to import most of its perishables from the U. S. Now it gets garden truck grown in Honduras by airplane from the fertile valleys beyond the coastal ranges. The inbound plane carries bales of merchandise, crates of hardware, sacks of cement, sheets of corrugated iron, and the same miscellany of goods to be found in any l.c.l. freight car. On the return journey it brings out native loaves of brown sugar wrapped in dried banana leaves, cans of lard, crates of eggs, bundles of dried meat, bound live poultry, tobacco, and similar produce.

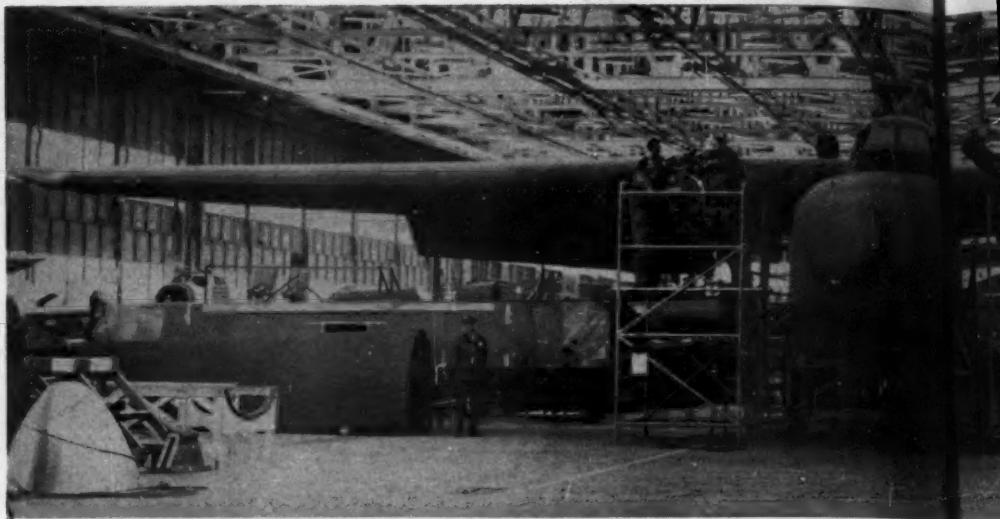
⁵ See Brief on behalf of American Export Airlines, Inc., CAB Docket No. 491, June 23, 1941, p. 15.

Two of the largest gold mines of Nicaragua, the Neptune at Bonanza and La Luz at Siuna, are completely dependent on the transportation of their supplies by TACA from the Atlantic coast and from Managua, where the greater part of U. S. shipments arrive. TACA originated the *flying tanker* by installing 600-gal. tanks in the cabin to haul fuel oil needed to operate machinery at the mines. Its planes have carried flocks of sheep, lime, and almost every conceivable type of item.⁶

Charges for air freight vary, but in general for shipments moving via the first plane the rate is five to seven cents a pound, while for those moving by slow freight, that is on the first plane having space available, the rate is two and one-half cents per pound. TACA's freight revenue for all types of merchandise averages approximately three cents per pound.

⁶ In an airline contract signed in 1939 in Nicaragua, the Government reserved passage to or from San Jose, Costa Rica, for each round trip. The contract stated that the Government had the option of exchanging such passage for the transportation of not more than 120 lbs. of live calves, poultry, or grafted fruit trees!

(Continued on Page 37)



Product of Curtiss research and design, soon to be made in quantity by New Orleans Shipbuilder Andrew J. Higgins, this is the new C-76—the Caravan—soon to undergo flight tests. The first transport type to be wholly developed since Pearl Harbor,



The Caravans A

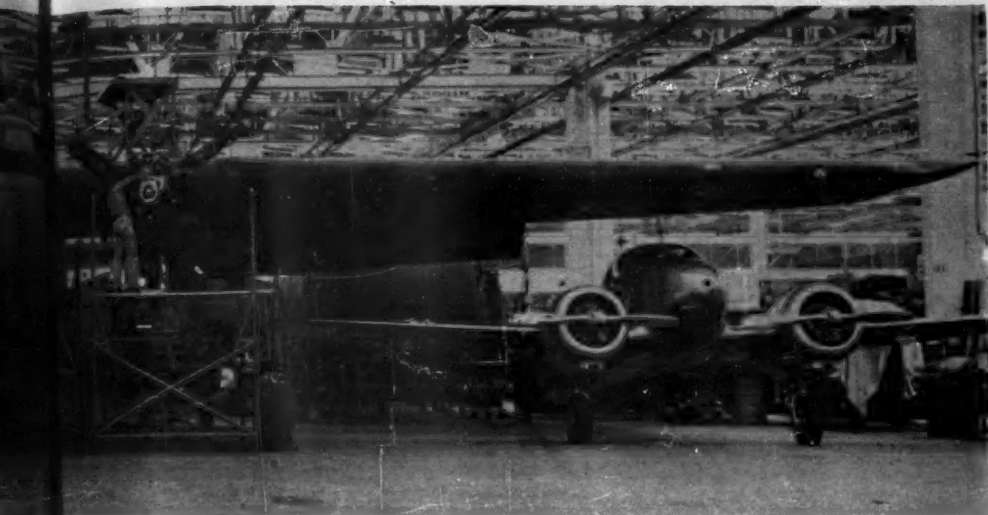
THIS month two great AIR CARGO stories began to take definite form. Two months ago, there came word from Washington that New Orleans' disappointed shipbuilder, Andrew J. Higgins, had been awarded a contract for 1200 cargo airplanes close on the heels of the cancellation of his huge ship contract because of lack of steel. What kind of planes nobody mentioned [AIR TRANSPORTATION, November, 1942]. Now, from mighty plane-building and engine-building Curtiss-Wright Corp. come details of the craft both it and Higgins will build.

First military transport plane of the present war to be built almost entirely of wood and other non-strategic materials, the new Caravan (C-76), is nearing completion in a plant of the airplane division of Curtiss-Wright "somewhere in Missouri" and will shortly undergo flight tests, according to Burdette S. Wright, of Buffalo, vice president of the organization and general manager of the airplane division.

The new "air freighter" was designed by Curtiss-Wright engineers to be built of wood and to be used by the Army Air Forces in transporting troops and vital cargo over the rapidly expanding supply routes extending to widely scattered battlefronts. First American military cargo plane to be designed in the

present war, it is the second transport type put into production this year by Curtiss-Wright, the other being the all-metal Curtiss (C-46) Commando—the world's largest twin-engined airliner [AIR TRANSPORTATION, October, 1942].

In the first description of the new Caravan approved by the War Department for publication, Wright said that it is basically an all-wood airplane combining molded plywood, laminates and plain lumber. Every wood-fabricating process contributing to rapid production is being employed. Since 65 per cent of production is subcontracted to the wood industry—a source of labor, machinery and skill not closely identified with the war effort until recent months—its construction has a



according to Curtiss-Wright, it is also America's first all-wood military transport craft. Deliberately planned as an "air freighter," it has a wingspread of 108 feet, length of 68 feet, two 1,200-horsepower engines. Cargo capacity is a military secret.

Are Coming!



minimum effect on existing aircraft production.

The new air freighter is a high-wing monoplane, has a wing span of 108 feet (approximately that of the giant Commando), is 68 feet long and is powered with two 1,200-horsepower engines. It is equipped with landing gear of the retractable tricycle type assuring its maximum maneuverability on small landing fields and is built so that its cargo floor is only 36 inches from the ground, thus facilitating rapid loading and unloading of cargo.

The control compartment is above the forward section of the cargo space and accommodates a crew of pilot and co-pilot—and a radio operator when desired. The cargo section will accommodate any component part of a plane except the fuselage and carries a cable to which the release cord of a paratrooper's parachute may be attached. Each plane can be equipped with fittings for towing gliders.

It possesses maximum efficiency as a low-stalling speed plane for transporting paratroops, air-borne task forces, field artillery and other military cargo over short runs of from 600 to 700 miles with frequent stops.

To illustrate the importance of military

transport planes with low speed landing characteristics in present warfare, Mr. Wright recalled how the German Air Forces used JU-52s as cargo planes in the bottle of Crete, "mushing" them through treetops and deliberately sacrificing them in order to deliver urgently needed supplies to ground forces without delay. The new Caravan, he explained, can be landed in such an emergency with the prospects of being damaged less than cargo plane types possessing higher speeds.

The Caravan is particularly well suited, Wright said, for operation in areas where there are little or no facilities for repairing metal airplanes such as in Alaska or in Latin America. It is especially adapted for operation over freight lines in those countries where servicing facilities are limited, where landing fields are small and operating conditions are difficult.

While the first Caravans are being built in Missouri, their quantity production will actually get under way shortly in a newly-erected factory "somewhere in Kentucky" where a system of feeding sub-assemblies into a main assembly channel will be followed. Coope-



Caravan Takes to Air This Month

BULLETIN: America's first transport plane to be built almost entirely of wood, the new Caravan was flown for the first time at St. Louis, shortly after noon on Jan. 6, it was announced by her builders, Curtiss-Wright. The flight lasted 12 minutes. Other transports of the same type already are in production for the U. S. Army Air Forces. This is one of the first pictures to be made of the completed Caravan.

rating in this mammoth production program are three major subcontractors, Mengel Co. of Kentucky, Baldwin Piano Co. of Ohio and Universal Moulded Products Co. of Virginia.

Woods used in the Caravan are hickory, spruce, birch, gum, mahogany and Douglas fir. The plywood ranges from three-ply used in the construction of the leading skin edges, to nine-ply employed in the center panel. The wings are of the conventional two-spar, box type construction while the wing spars are of laminated spruce cap strips, with plywood webs, internal diaphragms and stiffeners. The fuselage is of semi-monocoque construction.

The design of the new Caravan "air freighter" was conceived early this year and planned in conjunction with the U. S. Army Air Forces by George A. Page, Jr. and Dean C. Smith, director of engineering and transport contracts respectively for the Airplane Division of Curtiss-Wright Corporation. The project was launched quietly in March this year, long before the current controversy over cargo planes developed. Construction of the first Caravan was started in a Missouri plant pending erection of the new Kentucky factory. G. J. Brandewiede, formerly of St. Louis, is in charge of the latter factory.

The War Department, Wright said, has been sufficiently impressed with the design of the

Curtiss Caravan as to select it as the aircraft type which Andrew J. Higgins, the New Orleans shipbuilder, will construct to augment current production.

Thus, at least the Kentucky plant and the new New Orleans plant of Higgins will be producing Caravans in quantity. What will be the total production—and whether still other plants will eventually be swung into line behind the Caravan program—the War Department obviously isn't saying.

The Higgins program, of course, must await the conversion of his unfinished Louisiana shipyard into a mass production plane assembly plant. Since the job of building 1,200 planes differs radically from that of putting together the 200 Liberty ships Higgins was to have built, the conversion will take time. Higgins interests say, however, that the first planes will come off his production lines by next October.

Thus—though in a far different way than expected—comes a step toward fruition the dream of Henry J. Kaiser for huge cargo-plane production by shipbuilding interests. Mr. Kaiser, too, is at work [see page 26], but Higgins, ironically perhaps, seems to be closer to actual mass production. Though the Kaiser super-planes, once on a production basis, will undoubtedly be another and far bigger story.

Van Zandt: Air Cargo in Latin America—continued from page 33

While the company does not report ton-mile figures, the average distance freight is moved in Central America is certainly substantially less than on U. S. domestic airlines. Representative air express and air freight tariffs, reduced to a ton-mile basis, are shown in Table II:

TABLE II
Representative Cargo Rates per Ton-Mile on TACA

	Airline Distance (miles)	U. S. Cents per Ton-Mile	
		(^c) Air Express	(^d) Air Freight
Managua-Bluefields	171	98.3	49.2
Tegucigalpa-La Ceiba (^a)	144	97.2	34.7
Tegucigalpa-San Salvador	136	73.6	36.8
San Salvador-Managua (^b)	300	52.8	26.4
San Salvador-San Jose (^b)	513	58.5	29.3

(^a) Via Yoro and Olanchito.

(^b) Via Tegucigalpa.

(^c) \$0.75 U. S. minimum on local routes above; \$1.00 U. S. minimum on international routes. Air express rates apply to fragile articles, bulky and light articles, perishables, fruits, vegetables, flowers, trunks, baggage, furniture, bicycles, etc. Special rates for large shipments.

(^d) Minimum 50 lbs. Applies to articles not listed under air express. (Compare rates with average on all commodities on U. S. domestic airlines, of 80 cents per ton-mile.)

The "Chewing Gum Express"

The development by TACA of chicle air freight service in Guatemala was begun in 1935, when TACA purchased the defunct National Aviation Co. of Guatemala, said to have been forced out of business by competition with a local subsidiary of Pan American.⁷

To facilitate the movement of chicle, TACA constructed about 10 landing strips, all within some 50 miles of Flores, in the remote Petén District of Eastern Guatemala. From Flores these chicle-gathering centers could be reached by plane in about 15 minutes. The journey overland required an average of six days!

To move two tons of chicle from Flores 140 miles to Puerto Barrios, the port on the Caribbean coast, required 20 mules two weeks or more. TACA planes made the same journey in an hour.

The company concluded contracts with sev-

⁷ The two local companies were competing on the Guatemala City-Flores run and both ceased operations in 1935. The possibility of carrying raw chicle by plane had been suggested to the Compania Nacional and preliminary estimates indicated a charge of six and a half to seven cents per pound would permit the company to handle chicle at a profit. It is said that company officials rejected the idea, however, because the chicle was bulky, sticky, and difficult to handle; and their air freight and air express rates brought them in 50 cents to a dollar per pound. Thus the Compania Nacional and its competitor lost a golden opportunity, which TACA promptly recognized and developed.

eral chicle exporting companies, committing itself to transport all their inbound and outbound freight at a flat monthly rate. These agreements proved most satisfactory to all concerned: TACA was assured of a steady,

dependable monthly income; the companies obtained vastly superior and less costly transport for both inbound supplies and exports; and the government was able to collect a seven and a half cents per pound export tax which it had previously lost through extensive smuggling operations into Mexico and British Honduras.

During 1937 TACA carried out 1,350,000 lbs. of chicle from the Petén District to Puerto Barrios. By 1939 this had increased to 2,159,000 lbs. and in addition 2,326,300 lbs. were carried inbound.⁸ Diesel oil, for example, to run the power plant of the electric light works in Flores was flown by air from Puertos Barrios at three cents a pound, and lubricating oil at five cents a pound. Other material for the power plant if transported during the chicle season was at three cents a pound, and five cents a pound at other seasons.

During 1940 78 per cent of TACA's operating revenues in Guatemala came from freight. In one month, from the middle of December to the middle of January, 1941, well over a million pounds of chicle was transported.

Then due to an unfortunate series of events, the company was obliged to withdraw from Guatemala and local service was taken over by Aerovias de Guatemala, S.A., a company

⁸ CAB Docket 491, Exhibits 80, 82.

alleged to be under Pan American control. For the first six months of 1941, Aerovias reported a gross cargo business of some 2,400,000 lbs.⁹ A number of the fields established and serviced by TACA, however, are apparently not now in use and have probably been taken over by the jungle once more.

The shipping of chicle by air, which TACA originated and developed, has spread to southern Mexico and the Yucatan Peninsula. Of some 16 airlines in Mexico, five are primarily engaged in cargo operations, hauling principally chicle, as well as some tobacco, coffee, and rubber. For example, CAS—Woodside, in the State of Tabasco, carried some 1,500,000 lbs. during the first six months of 1941.

Germans Pioneer in Colombia

Two former Austrian and German pilots of World War I established the earliest airline in South America in 1920. This was the Sociedad Colombo-Alemana de Transportes Aereos, or "Scadta." For almost two decades it operated with marked success. Then in 1939 it was nationalized and merged with Saco, a small local Colombian airline, to form Aerovias Nacionales de Colombia, known as Avianca.

No small part of Scadta's success was due to its air cargo operations. As Table III shows, the volume of cargo transported in Colombia during the past five years was close to 60,000,000 lbs., almost twice that on U. S. domestic air carriers and about three-fifths that of TACA during the same period.¹⁰

As in Central America, the immense topographical obstacles presented to development of surface transport gave impetus to the growth of air cargo.

In 1920 about 80 per cent of the commerce of Colombia moved along the route of the Magdalena River, between the Caribbean port of Barranquilla and the isolated mountain capital of Bogota. The journey by river steamer normally required eight to 14 days

TABLE III

Air Cargo Operations in Colombia During Past Ten Years

Year	Cargo Transported (Lbs.)
1932	1,580,000
1933	1,630,000
1934	3,085,000
1935	5,500,000
1936	5,883,000
5-year total	17,678,000
1937	8,940,000
1938	11,950,000
1939	12,470,000
1940	12,500,000
1941	14,100,000
5-year total	59,960,000
10-year total, 1932-41, inclusive	77,638,000

during the rainy months, and in the dry season was subject to frequent and lengthy interruption. Even the old single-engine, float-type Junker planes first employed changed this uncertain and hazardous mode of travel to an ultra-rapid and dependable service of seven hours.

Another example of the "made-to-order" business offered by Colombia was the route from Girardot (Bogota railhead) to Neiva, about 100 miles south. Scadta early added this route to its spreading airline network and reduced a four-day muleback trip to an hour by air.

These advantages encouraged Scadta to charge relatively high rates, which still average well over a dollar per ton-mile. On the Medellin-Cali route, for example, current freight rates average \$1.20 per ton-mile, and on the 450-mile run between Bogota and Barranquilla approximately \$1.15 per ton-mile.¹¹

From as early as 1922 Scadta paid cash dividends. The initial rate of three per cent was doubled in 1923 and doubled again in 1926. During the 10 years preceding its nationalization in 1939, earnings were equiva-

⁹ CAB Docket 588, April 14, 1941. Company officials estimated future cargo operations at 500,000 lbs. per month.

¹⁰ The record is not entirely clear as to precisely what is included in "carga transportada," shown in the table. No ton-mile statistics are reported, but the average haul in Colombia is probably considerably longer than in Central America, although of course substantially less than on U. S. domestic airlines. On routes such as these, ton-air-mile figures are likely to be most misleading in attempting to evaluate the service rendered, although they are helpful, of course, in deriving unit operating costs.

¹¹ An additional advantage of shipment by air is freedom from pilferage, theft, and breakage. Insurance rates for protection against average theft and pilferage on foreign merchandise moving over the interior transport system are very high for certain types of merchandise. The insurance rate on women's hosiery when shipped by air is half the rate on other types of carriers.

lent to a complete return of the original investment, while the initial equity was preserved and increased.

An average of more than half of the company's net revenue, however, came from sources other than transport. During the Colombia-Peru War, for example, Scadta added to its revenues commissions paid by the government for the purchase of planes. From 1936 to 1939, the company made substantial profits out of aerial exploration and photographic work for oil concerns.¹² In addition, the company derived a considerable revenue from the sale of its own postage stamps, for which it paid the government a certain percentage. In 1940 Avianca's total stamp revenues amounted to over 500,000 U. S. dollars. There is even a profit from the sale of air mail stamps to collectors.

Scadta had large remunerative annual contracts with the Shell company and other oil interests. Knocked-down autos, supplies, pipes, drilling equipment, and material of every kind were carried over the mountains to the *llanos* of eastern Colombia. In 1940, when the German personnel were separated from the reorganized company, two of the dismissed German pilots purchased some second-hand Beechcrafts and obtained contracts with Shell Oil and Richmond Petroleum to operate an unscheduled air freight service in the sparsely populated *llanos* under the corporate name of Arco. Avianca was eventually obliged to buy them out, at a good profit to the operators.

Fram Llama to Airplane in Bolivia

Another early operation, also sponsored by the Germans, in 1925, was Lloyd Aereo Boliviana in the landlocked Republic of Bolivia. Its first operations were between Cochabamba and Santa Cruz, a 200-mile journey which the planes reduced from four days to three hours.

By 1938 LAB was flying close to 500,000 miles a year over some 3,000 route miles, from

Cochabamba to the rubber-growing regions of the Beni and Madre de Dios rivers; from La Paz north to Apolo and San Borja; on both a direct and "saw-tooth" transcontinental route to Puerto Suarez, at the Brazilian border; and south from Santa Cruz to the Argentine frontier.

Through the services of LAB, Bolivia is in the process of passing directly from the llama and the pack animal to the airplane as a major means of transport. To an even greater degree than most South American countries, the country is dependent on air transport. Broadly speaking, it is divided between a high plateau, ranging from 12,000 to 14,000 feet above sea level, and a low alluvial tropical plane which is drained by the tributaries of the great Amazon and Paraguay rivers systems. Railway and highway communication between the plateau land and the lowland is practically non-existent. Air travel remains, and will continue to remain for many decades, the only feasible means of rapid transport for passengers, express, and freight.¹³

Freight traffic has always been an important element in Bolivian airline operations. In 1940 it amounted to 2,300,000 lbs., representing 40 per cent by weight, of the total revenue load carried and bringing in four-fifths as much revenue as passengers.

The old LAB, prior to reorganization, had a sliding scale for freight which, for essential foodstuffs in quantities of 500 kilos or more, was often as low as 20 cents per ton-mile or less.¹⁴ Average freight rates were equivalent to about 25.5 cents per ton-mile and passenger fares to 4.7 cents per passenger-mile.

In an attempt to improve the financial position of the company after the reorganization, these rates were replaced in May 1942 by a commodity-freight rate system, the effect of which was to increase all freight tariffs sharply. Shipments under 100 kilos were raised approximately 100 per cent for all types of

¹² A number of years ago the company gained considerable prestige when a Swiss Boundary Commission engaged it to assist in the settlement of the boundary dispute between Venezuela and Colombia in the vicinity of the Catatumbo River. This inaccessible region, mountainous, densely forested, and inhabited by savage Indians, offered an almost impossible obstacle to ordinary surveying methods. Experts estimated the cost at \$200,000 and the work at two years. Scadta completed the preliminary survey in 16 days, covering the area of one million hectares. The photographs were reduced to mosaic charts in two months and the completed maps were accepted by the Commission as entirely satisfactory.

¹³ In May, 1941, the company was nationalized by the Bolivian Government. The routes to the Brazilian border were turned over to Panagra and the remaining lines were assigned to a reorganized LAB under a five-year management contract to Panagra. LAB's present route mileage is approximately 2,100 miles with scheduled services of about 250,000 miles per year.

¹⁴ Between Cochabamba and Trinidad (270 miles), one of the company's principal routes, the rates up to 100 kilos ranged from 54 to 71 cents per ton-mile. For essential foodstuffs, rates were equivalent to 16 cents per ton-mile, and 72 cents for other products, in quantities over 500 kilos.



Unloading a 3,280-lb. motor generator unit at a TACA airport in the heart of Nicaragua jungles. It will be used in extensive mine operations.

commodities, and other groups were substantially increased, as shown in Table IV:¹⁵

TABLE IV
Cochabamba-Trinidad
(270 miles)
(Equivalent rate in
U. S. cents per ton-
mile at 40 Bs. per
dollar)

1-100 kilos	125
Over 100 kilos (*)	
Group A commodities	42
" B "	53
" C "	65
" D "	125

(*) Group A includes rice, sugar, fresh meat, fresh fruits, flour, corn, butter, wheat, potatoes, salt, vegetables and other essential foodstuffs, and cocoa, beans and coffee. This group corresponds to the "essential foodstuffs" classification of the rates in effect prior to May 1, 1942.

Group B includes other foodstuffs, drugs, medicines, almonds, almond oil, leather, cinchona bark (quinine) and chicle.

Group C includes cloth, clothing, shoes, automobile parts, books, school books and magazines.

Group D includes baggage, radios, films, drinks, typewriters, tobacco, magazines, imported foodstuffs, imported preserves, small parcels and all other articles not included in the other groups.

¹⁵ It is too early yet to know what effect on the net financial position of the company this increase in the rates will have. That the volume of freight moving by air in Bolivia, however, will not thereby be increased seems reasonably certain. This approach to the problem is just the reverse of that successfully used by TACA in Central America.

The company also contracted last summer with the government to transport fresh meat from the lowlands of Bolivia to La Paz and Cochabamba, at an hourly chartered rate. Assuming capacity loads, the charge is equivalent to approximately 45 cents per ton-mile.¹⁶

Mine Equipment Flies in Peru

An interesting example of the contribution of the plane to the development of the continent is the transport of mining freight by air. One of the first ventures of this kind was in 1933, to an old Peruvian gold mine known and producing in the days of the Incas, high up in the heart of the Andes.

The problem was to get modern equipment to the mine. Although only about 40 air miles from Cuzco (11,000-ft. elevation) to the mine site at Huanacopampa on a plateau 12,800 ft. high above the Apurimac Valley, the trip involved 10 days or more by muleback along narrow and dangerous trails. Transport of large pieces of machinery was impossible.

Panagra undertook to solve the problem with Ford trimotors and during 1933 and 1934

¹⁶ These experiments in shipping fresh beef by airplane in Bolivia have caused speculation in Chile as to whether fresh beef could not profitably be flown across the Andes from Argentina to the Pacific Coast port of Antofagasta, instead of slowly driving the live animals through the desert and over the mountains. The pass at that point is 12,600 ft. high and in the winter is frequently closed by snow.

transported some 1,500,000 lbs. of mining machinery, including a complete milling, amalgamating, and cyaniding gold plant, a hydro-electric plant, and other equipment.²⁷

From 1936 to 1938, Panagra also operated what was widely known as the "Tipuani Gold Special," to another ancient Incan mine on the eastern slopes of the Andes in Bolivia, which had been neglected for centuries because of transport difficulties. Recently, the reorganized LAB company has again entered into contract with the Aramayo brothers to transport equipment, personnel, and supplies from La Paz to Tipuani, using a Lockheed Lodestar in place of the ubiquitous Ford trimotor. The flight takes about 35 minutes, from the airport at La Paz at 13,000 ft., across a mountain range whose peaks rise to over 20,000 ft., and down to 1,500 ft. elevation at Tipuani, where a landing strip with a dog-leg has been cut out of the forest at a bend in the river.

Another remarkable mining service was undertaken in 1936 by Condor Peruana de Aviacion, operating Curtiss Condors, under the leadership of a pioneering American, Hugh Wells. The Parcoy Syndicate in northern Peru had a valuable but relatively inaccessible mining property in the Cordillera, about 100 miles east of Trujillo.

Wells scraped out a one-way landing strip in the gravel bed of a stream at the head of Lake Paz, near the mine, and during the next two years flew in some 7,000,000 lbs. of machinery and materials. Panagra also hauled some freight for the Parcoy Syndicate in 1936.²⁸

Wells also developed the haulage of tobacco for the Peruvian Government, bringing out some 500,000 lbs. from San Martin (sometimes called Tarapoto), east of the Andes, to Lima. When the Condor company ceased operations

in April, 1941, Faucett Aviation Co. continued to transport tobacco, in connection with its scheduled passenger service between Chiclayo and Yurimaguas. The only other way to move this tobacco is to float it some 400 miles down the Hulla and Marañon rivers to Iquitos, and thence 8,000 miles by boat, via the Amazon and the Panama Canal, to Lima.²⁹

Air Cargo on the Long Haul

Undoubtedly, there is a large amount of commodity traffic potentially available to be carried by air, between the North and South American continents. This type of business, however, had not been developed any more successfully prior to the War on the international routes than on domestic airlines in the United States.

The emphasis thus far, both in the U. S. and on the Pan American Airways System, has been on de luxe first-class transportation for passengers and mail. Return from the carriage of the relatively small volume of high-class emergency shipments has amounted to only three to five per cent of the total operating revenue, in both cases, as shown in Table V (on opposite page).

The emergency or special nature of most of these shipments is indicated in Table VI, analyzing express originating at various points along the West Coast of South America, on the Pan American-Grace system, during 1940³⁰. Cut flowers, gold jewelry and medical shipments account for over 45 per cent of the total. Orchids and baby chicks by air make colorful copy, but *something more substantial will have to be developed to fill the cargo planes of the future.*

The Advent of the War has brought about for the first time the development of long-haul air cargo operations on a substantial scale. It is not appropriate to discuss these operations here. It should be pointed out, however, for

²⁷ CAB Docket 623, July, 1941, Exhibit No. 32.

²⁸ CAB Dockets 623 and 716, April, 1942, Statement of Evidence Submitted on Behalf of Pan American-Grace Airways, Inc., p. 205, and Exhibit 100. Panagra "found that its duties as an international common carrier of passengers, mail, and express made it impossible to devote considerable attention to the specialized operations involved in hauling freight into the mining regions . . . Even from the economic viewpoint, the contracts performed are not considered as attractive, as the relatively small amount of profit shown hardly justifies the amount of supervision required to carry out these jobs as well as the risks inherent in this type of operation." The difficulties of mining and oil companies in Ecuador in obtaining satisfactory terms locally for air freight service are of interest in this connection. See "Report on Domestic Commercial Aviation in Ecuador," April 1, 1942, prepared by the Defense Supplies Corporation of the U. S. Government, pp. 32-34.

²⁹ See *Survey of the Field for Air Transport Development in Peru*, by J. Parker Van Zandt, Aeronautical Consultant, Defense Supplies Corporation (RFC), April, 1942, p. 82. The Ministerio de Hacienda has stated that there are at least 800,000 lbs. of tobacco which it would like to see transported annually. At one sol per kilo, or seven cents per pound, the present rate paid to Faucett, this would be equivalent to 33 cents per ton-mile on the 420-mile route from San Martin via Tingo Maria to Lima. (Faucett's average commodity charge on coastal routes is about 35 cents per ton-mile and its cargo operations in 1940 accounted for 22 per cent of the total revenue earned.)

³⁰ CAB Docket 623 and 716. Statement of Evidence Submitted on Behalf of Pan American-Grace Airways, Inc., April, 1942, p. 199. See also *International Air Transport and National Policy*, by Oliver J. Lissitzyn, 1942, p. 53.

TABLE V

		Pan American- Grace Airways, Inc. ^a	Pan American Airways Eastern & Western Div. ^b	U. S. Domestic Air Mail Carriers
Total Operating Revenue	1940	\$2.35	\$2.24	\$0.69
per Revenue Mile Flown	1941	2.23	2.03	0.71
Express Operating Revenue	1940	\$109,725	\$490,100	\$2,074,500
	1941	206,689	843,550	2,910,500
Express Operating Revenue	1940	7.2 cents	10.0 cents	1.9 cents
in cents per Rev. Mile Flown	1941	8.7 "	10.0 "	2.2 "
In % of Total Oper. Rev.	1940	3.0%	4.5%	2.7%
	1941	3.9%	4.9%	3.0%
Express Carried, lbs.	1940	170,000	1,074,300	12,560,700 ^c
Average Express Revenue per lb.	1940	\$0.65	\$0.55	\$0.17 ^d

^a CAB Orders Serial No. 1869, July 30, 1942; and Docket 623.

^b CAB Orders Serial No. 1913, August 28, 1942; and Docket 298.

^c See Table I; this is the total poundage reported by the carriers, including duplication due to shipments which are forwarded over more than one airline.

^d This is the average revenue per (duplicated) lb., as reported by the carriers. The average charge per unduplicated lb. paid by the shipping public was 39.8 cents, of which the Express Company retained approximately one-third. See paper on Air Express, by C. G. Paterson, read before the Institute of the Aeronautical Sciences, January 30, 1942.

those whose enthusiasm for air cargo may thus have been aroused, that it still remains to determine what proportion of these and similar shipments will continue to travel by air, after the emergency is over.

The transportation of commodities is a business competitive principally on a price basis, and the airplane must be prepared to compete with surface transport in this field.²¹

The future of air cargo operations in Latin America, both between the various Latin American countries and between the North and South American Continents, is exceedingly difficult to estimate. It involves a thorough study of potential post-war trade volume, of ultimate air freight rates, of competitive transportation, and of many other related aspects. Unfortunately, no adequate statistics as to traffic in merchandise suitable for air transport within the Latin American area presently exist.²²

²¹ *Air Transportation and National Policy*, May, 1942, National Resources Planning Board, Part II—Section I, "Air Transport," by J. Parker Van Zandt, p. 350.

²² A comprehensive and authoritative discussion of Latin American air transportation by William A. N. Burden is scheduled for publication by the Council on Foreign Relations during the Winter 1942-3, under the title *The Struggle for Airways in Latin America*.

TABLE VI

Percentage of Total Number of Shipments from Quito, Lima, LaPaz and Santiago, 1940

Cut Flowers	7.8
Newspapers	7.2
Medicine and Pharmaceutical Products	15.8
Samples	7.8
Spare Parts	3.6
Documents and Common Papers..	3.9
Printed Matter	5.8
Films	9.7
Valuable Shipments, Gold Platinum, Currency, etc.	21.5
Textiles	1.2
Foodstuffs	1.0
Clothing and Personal Effects....	2.8
Leather Goods	0.5
Miscellaneous	11.4
	100.0

If the annual volume of U. S.-Latin American commodity exchange can be maintained in excess of two billion dollars a year (as it was in 1929, for example), and sufficiently attractive air cargo rates can be established, there should be a potential business of several hundred million pounds awaiting the inter-American airlines.

All-Cargo Planes Still Some Distance In the Future

Lockheed's Sheehan Predicts Combined Passenger-&-Freight Craft for First Post-War Years

By J. V. SHEEHAN
Lockheed Aircraft Corp.

UNTIL peace returns, we in the aviation industry have gladly and wholeheartedly pledged ourselves and our activities to the early and successful prosecution of the war by the United Nations. This is as it should be. And until it has been accomplished there shall be no deviation in our efforts, no sidetracking of the issue. Nothing shall be allowed to deter us in our progress to this goal.

We have been given a unique, though unwanted, opportunity to prove (and there is no doubt that it is constantly being proved) the worth of the airplane as a vital factor of war strength. It is not only in combat operations that its importance has been demonstrated but it is, as well, playing a part of no small degree in solving the problem of distribution of war materials to the far-flung theatres of activity. Many of these vital supplies are being transported to the fighting outposts of every corner of the world in airplanes made available through the backlog of the domestic commercial air transport system. Although many of these ships were never intended for cargo purposes the necessity of over-night conversion and improvising with what was on hand has resulted in broadening our experience and our knowledge of the problems of the various phases of the transportation of cargo. This, not only for immediate military uses but for the commercial post war era as well.

Cost Has Been No Obstacle

We have gained this knowledge with an utter disregard of cost, for cost has given way to the necessity of delivery—delivery of

vital replacement parts for tactical aircraft and tanks and other implements of warfare, as well as goods and supplies indispensable to our fighting forces. *The Army Air Forces have become the proving ground for many phases of tomorrow's commercial air cargo services.* As one Army man recently put it: "You boys are getting quite a break," he said, "pioneering the cargo transport field at the taxpayers' expense." That's true, of course, but it is also true that it is to the eventual benefit of this same taxpayer.

Post-war prospects present the aspect of another challenging opportunity, for there are many problems confronting us in the reconstruction period in which distribution again will play an important role. It may even be that in this coming period the visionary possibilities of air cargo transport will become tangible realities.

In considering the part the airplane will play in commerce tomorrow, the present attitude toward the cost item will be reversed—this item will then be of paramount importance. But before we get into the economic aspect of post-war carriage of air cargo, let us consider several fundamentals: *first, what amounts and kinds of cargo do we foresee the airplane's potential as a cargo carrier in times*

of peace, and how will it be affected by the necessity of speed in this era?

It was pointed out in an air cargo study recently completed that the strategic cargo required to be exported from the U. S. in the next twelve months will total between 40 and 45 million tons. This reaches a total movement—using airline distances—of approximately 220 billion ton-miles. Of this about 20 per cent of the nonmilitary commodities for export was suitable for air cargo. However, about 50 per cent of the present-day military exports is so suitable.

Some Products Cannot Fly

In 1941 Class I railroads originated 1.2 billion tons of freight. Of this amount 684 million tons (56 per cent) constituted coal, ore and other products of mines which, on cost basis, would not be shipped by air.

An additional 189 million tons, or 15 per cent, consisted of products of agriculture, animals, and forest products which also, to a large degree, will not be subject to air shipment in the near future. From this latter classification, perishables—fruits, meats, etc.—will be eligible for air shipment, and foods generally, particularly if strides are made in dehydration [see *Foods Delivered by Air*, AIR TRANSPORTATION, October, 1942].

The bulk of rail freight which would be subject to air freight competition would be in the field of less than carload lots, and manufactures and miscellaneous items. In 1941, l.c.l. freight totaled over 18 million tons [see page 47].

It is our belief that the airplane potential in the over-all transportation scheme is of a supplemental nature and not one to replace the railroads or steamships. And the airplane's claim to carry its part of the immense total of tonnage is too sound to be jeopardized by wild claims that it is ready to haul heavy commodities—such as products of the forests and mines—in times of peace, across the face of the globe. It is expected that certain refinements of our present engine, propeller, and aerodynamic designs will be developed for more efficient airplane performance, thereby lessening operating costs. These factors, however, are limited, and it would not be safe to assume that they would bring the operating costs of aircraft down to compete with the lower classes of materials.

Let us consider, for example, the l.c.l. freight field which averages about 4 cents a ton mile. As I said this traffic amounted to around 18 million tons on the Class I rail-

roads in 1941. While this is $1\frac{1}{2}$ per cent of the total freight carried, it represents about 2,000 times as much as the total air express carried by all domestic airlines last year. If we were able to compete on an economic basis—and suppose we had an airplane with a payload of 16 tons, which cruised at 250 miles an hour, and that we could fly each plane 3,650 hours per year—it would take 620 of these planes to move the 18 million tons of l.c.l. freight. This, of course, does not take into account the rail express or mail traffic. Therefore, we should concern ourselves at the present with the planning of equipment on which the cost of operation would permit us to compete for these higher classes of surface freight, express and mail markets.

Cargo-&Passenger Planes Favored

An analysis of a market survey of the domestic operators which we recently made indicates that 83 per cent of the carriers believe that cargo-carrying facilities should be considered a part of future passenger airplane design for domestic trunk line and primary connecting operations in the post-war period. But many of these operators have expanded their conception of future activities to include transoceanic operations; and a number have added that the process of rehabilitation in foreign countries and the reestablishment of markets would require a special cargo airplane in view of the necessity of speed in the delivery of essential foods—particularly perishable foods—and goods in great quantities suitable for airplane transport. Although surface competition could render a service at less cost, speed in the transport of such commodities would justify the premium involved.

Further analysis of this survey showed that a combination passenger and cargo plane for the so-called "off-line" or "feeder line" service was wanted. This would seem to be a logical step in the development of this service, and it is possible that this plane could be used also for transportation inland in the isolated or normally inaccessible areas in foreign countries.

As we have pointed out, the operators' desire—lacking any experience index in the field of solely air cargo transportation—is for a combination passenger-cargo plane for domestic service. Although we can understand their reasoning, we believe that in order to attain the greatest efficiency—that is, the lowest ton-mile cost—we should use the sharp-

est tool to accomplish the particular job. And in this case, we believe that *ultimately the sharpest tool must be the exclusive cargo plane*. Though we agree that a combination passenger and cargo plane would have many of the features which go to make up either low seat-mile cost or low ton-mile cost, we nevertheless believe that the basic advantages to be gained in efficient cargo operation can best be obtained in the preliminary design of an exclusive cargo plane. Many of the essential factors—such as stowage and handling facilities and their supplementary features—which go to serve for the efficient operation of cargo ships may not serve as the sharpest tool for the efficient operation of passenger airplanes, and vice versa: for example, the design necessary for increased payload and stowage, for additional hatches—all of which serve to lessen speed—may not be practical for passenger operation.

Carrying this further, a great deal depends upon the nature of the routes: whether they are primarily large potential passenger or cargo territories. And it may be that the peculiar requirements of the passengers on the one hand and those of the cargo on the other may differ greatly. For instance, it may be that the greater volume of passenger traffic desires to depart and arrive at its destination at hours most suitable to passenger requirements—that is from 5 p.m. to 9 p.m.—whereas it may be more advantageous for cargo to be picked up and delivered at the airport and depart at a later time, so long as it fits in with an early morning delivery, which might be anytime between 12 and 4 in the morning.

Operators Take Cautious View

In defense, then of the operators' desire for an airplane which they feel most suited to the immediate post war needs, from the standpoint of size, our studies showed that in general the greater the size developed efficiently around any given horsepower, the lower the unit operating cost would be. Their reasoning for a large combination airplane is to accommodate the increased passenger business and, at the same time, get their feet wet, so to speak, in the cargo field.

They do not expect that there will be a sufficient volume of business in the latter field at first—that is, not until the manifold problems of regular domestic cargo operations have been solved—to warrant the purchase of a separate cargo airplane. The problem is not only in refining the various aspects of the airplane to lessen costs in order to compete

with other express and cargo markets, but there are other, indirect factors. A few of these problems, the solving of which would result in a lowering of rates, are a nationwide pickup and delivery service, a more uniform method of stowage and transshipment, adequate handling facilities and the education of the public from the change of normal habits to that of shipping by air. They believe that a larger combination plane providing greater passenger seating capacity and, as well, cargo, would give the greatest efficiency and lower unit operating cost during the initial stages of domestic cargo development. It is on this theory, then, that the following studies have been developed.

Our surveys indicate that the cargo field will be comprised of four categories: 1. Transoceanic; 2. Transcontinental; 3. Primary Feeder; and 4. Secondary Feeder. Our survey deals only with the domestic categories.

In examining the airplanes best suited to accomplish these tasks, we have analyzed them from various aspects, using low ton-mile cost as the criterion: first, size; second, number of engines; third, payload; fourth, range; and fifth, speed.

The criterion used in this paper for measuring design variation is operating cost per ton-mile of payload. Payload figures were based upon airplane operation at 50 per cent normal rated power, with zero wind and zero fuel reserve. The operating costs were computed by means of a set of cost-estimating formulas originally developed for computing and forecasting cost of passenger airplane service but modified here for application to cargo operation. Owing to the scarcity of data on air cargo services, there are a number of unknowns in the formulas; hence as an absolute measure, their accuracy may be somewhat lessened. But the formulas nevertheless provide a valid comparison of the various airplanes studied. The costs charted include direct flying operations, direct flying maintenance, and direct flying depreciation expense. In addition, the total operating cost figures used include an allowance for overhead, embracing indirect operations, maintenance, and depreciation, traffic and advertising, and general administrative expense. No attempt has been made to estimate and include the cost of pickup and delivery service.

Total operating costs were estimated by applying these formulas to a series of hypothetical airplane designs. The design studies were complete and were carried out in considerable detail. . . .

To investigate the economic effect of size,

number of engines, range, and speed, various groups of designs were selected, each group providing variation in one of these characteristics. Payloads and operating costs for each series of airplanes were then computed.

* * *

Size Has Effect on Economy

These studies illustrate what we believe to be a primary principle in airplane economics: namely, the larger the airplane, the lower the operating cost per ton-mile. This principle is not of course of unlimited application. For as size increases, operating cost does not decrease proportionately but moves toward a limiting value. However, it is clear that in the size ranges being considered at present the largest airplane can operate at a much lower cost per ton-mile than can the smaller airplane.

The reason for this relationship appears to be due primarily to aerodynamic considerations and, to some extent, to economic considerations. Aerodynamically the larger airplane is the more efficient since (1) the diameter of the power plant decreases with respect to the airplane as airplane size goes up; (2) the skin friction drag coefficient decreases as size increases; (3) protuberances into the airstream, such as door handles, become relatively less important, and (4) the ratio of useful load to gross weight increases in the larger airplanes, at least throughout the size range under consideration.

Number of Engines Has Bearing

The number of engines designed into each unit has, of course, a direct effect upon operating cost, and this effect was studied by comparing two- and four-engine airplanes having about the same total horsepower.

* * *

These studies point toward the conclusion that for minimum operating costs per ton-mile, where speed is a factor, the twin-engine cargo airplane is the most efficient where the size of the airplane permits the use of two engines.

As to range, we are led . . . to the conclusion that the four-engine airplane is relatively better able to compete with the twin-engine as a cargo carrier at the longer ranges. From the data at hand it is not possible to determine what these ranges are for all classes of airplanes, but for the airplanes plotted, in the 4,000-4,400 horsepower range, it appears that the twin-engine airplane has its

best advantage under 250 miles, whereas the four-engine airplane's position is relatively improved at ranges over that figure.

The operating cost curves for both planes show an upturn at short ranges illustrating the increased effect of maneuvering and taxiing time on short trips.

It may be stated that in a series of four-engine cargo airplanes, similar to those under discussion here, speed must be paid for on each ton at about the rate of $\frac{1}{4}$ cent per mph. In two-engine airplanes similar to those studied speed is worth about $\frac{1}{10}$ cent per mph. Whether or not this price is justified is not within the scope of this paper but is a matter which will have to be determined by the prospective users of these airplanes.

In conclusion, first, it appears that our domestic markets in the immediate post war era, from an economic standpoint, seem to fall in the following order by virtue of tariff and speed competition: (1) rail express and first-class mail within certain range limits; (2) l.c.l. freight. Second, as an outgrowth of advanced research because of the war, larger and more efficient airplanes will be produced which will bring airplane operating costs to within a reasonable limit of these markets. Third, the trend will be toward the operation of large combination passenger-cargo planes for trunk line and primary connecting carriers which, after the groundwork has been developed for the servicing and handling of cargo, will give way to exclusively cargo airplanes. The secondary feeder and off-line feeder plane will be a convertible combination passenger and cargo plane. Fourth, the largest airplane which can be built will offer the cheapest operating cost per ton-mile. This necessarily assumes that sufficient payload will be available for this airplane. It has been shown that a two-engine airplane is the most economical to operate if the payload requirements do not dictate an airplane larger than can be handled by the two biggest available engines.

As the airplane was originally devised as a peaceful medium of transportation, though it today has been developed as principally a lethal weapon, we will see its return to the use of its original conception, and peace and commerce will ride its wings tomorrow.

TRANS-CANADA AIRLINES has named Harper McNeill, formerly traffic representative, to the post of district traffic manager in New York. He takes over duties of A. P. Wilson, on leave to become a pilot officer in the RCAF.

Domestic Air Cargo: The Practical Side: Packaging & Handling

Railway Express' Chief Engineer Analyzes the Brass Tacks of What Can Now Be Foreseen

By C. G. PETERSON

Chief Engineer, Railway Express Agency, Inc.

IT IS an honor, doubly esteemed as a former member, to appear again before a session of this great Society of Engineers. It was some 17 years ago when, in the interest of selling more airplane engines for the company I was then working for, that I was last privileged to give the members my views on the development of AIR CARGO, as I was then convinced cargo would build up before passenger or mail traffic.

Now I appear as an employe of Railway Express, a common carrier which has pioneered and developed cargo carrying by air in the U. S. Since its first full-scale common carrier air cargo experiment with a war surplus four-engined 28,000-lb. plane in 1919 [See *Cargo-by-Air: 15-Year-Old Reality*, AIR TRANSPORTATION, October, 1942], the Express company has done its utmost to progress cargo carrying by air. In 1927, it eagerly joined with the first group of transcontinental air mail lines to offer simultaneously transcontinental air express. The data gathered by Railway Express Agency during the ensuing 15 years it has worked with the domestic airlines is one of the reliable sources of information. Some of the data given herein from this and other sources has been previously given to the industry, but is repeated here as a convenience for ready usage.

This paper relates to commercial traffic as differentiated from the cargoes being handled in connection with the war effort. Although it contains some data that show that many of the largest tonnages of traffic cannot be profitably flown, even with highly efficient planes in the post-war period, yet I am firm in the belief that air cargo within the U. S. has a tremendous future. Some 33 tons per day are being flown an average of about 1,075 miles, producing a substantial revenue to the airlines.

Almost all post-war domestic air cargo will be of the same general nature as now moving by air or surface transport. While the speed

of air transport may develop new industries that will ship their products extensively by air, there have been no such industries developed in the past and none are apparent in the immediate future. A near approach has been the special lightweight edition of periodicals for foreign subscribers that have been published here [e.g. *Time's Air Express* Edition and in Europe, but these are in fact only a lighter model of the publishers' standard product.

The vast amount of traffic moving in the U. S. by surface means is indicated in the tables prepared and copyrighted by H. E.

Hale of New York. Appended are some estimates relative to the ton-miles of rail traffic of Railway Express Agency:

Revenue Ton-Miles in U. S.		Billions
Steam Railroads	1941	477
Great Lakes	1940	95
Pipe Lines	1941	60
Trucks	1941	44
Inland Waterways	1940	21
Railway Express Rail	1940	1 3/4
" " "	1941	2 1/4
Parcel Post—Fiscal Year...	1941	4/5

Notwithstanding the statements made in the hope of headlines by publicity seekers who have found in air cargo a new sounding board, the nature of most of this vast tonnage is such there is little probability of much of it ever being carried by domestic airlines within the U. S. The ton-miles carried by rail in 1941 were an all-time high—the greatest volume of traffic on record. AAR data shows the Class I railroad freight tonnage in 1940 was:

Products of Agriculture	9.0%
Animals and Products	1.8%
Products of Mines	53.9%
Products of Forests	6.1%
Manufactured Goods & Misc.	27.7%
L. C. L. Freight	1.5%

Of these, bituminous coal ranked first in carload tonnage and revenue. In 1940, one-sixth of the freight revenues of the American railroads was produced by bituminous coal. In 1941 the average revenue per ton-mile of freight carried on the railroads was 9.36 mills, or less than 1 cent per ton-mile. The average revenues per ton-mile on railroads of the U. S. and Canada are the lowest in the world—with the single exception of Japan—as shown by the figures for the last years available.

Practically all full carload rail shipments are loaded and unloaded by the patron and at the patron's expense. It is impossible to think of air carriers setting out planes for shippers to load with their untrained employees, or to leave planes standing for unloading when it suits the consignee's convenience.

L.c.l. freight shipments are any shipment of freight which is too small to move on a carload rate. Numerous class rates are used, some being higher than the first-class rate and many lower. In some instances, rates include pickup and delivery. At over 1,000 cities Railway Express has been selected by the local railroad as the most efficient means

to perform this service just as most of the airlines have selected Railway Express. In all cases l.c.l. freight is handled in and out of the cars by railroad employees, and the carrier is responsible for damage if mishandled. In a recent report, it was worked out that for several typical movements the first-class l.c.l. rate varied from 3.9 cents per ton-mile on a 907-mile haul to 6.6 cents on a 527-mile haul and 5.3 cents on a 2,259-mile haul. A minimum l.c.l. charge is made which is almost invariably the charge for 100 lbs. even though the shipment weighs less. Estimates of the average weight per shipment vary from 250 lbs. to 350 lbs.

Of the traffic on the Great Lakes, a considerable portion of the tonnage is coal and ore, frequently loaded into the vessels by car unloaders which raise and tip over an entire carload. The unloading is accomplished by highly mechanized equipment. Grain boats are loaded and unloaded at completely mechanized storage elevators. Package traffic has diminished on the Great Lakes. In normal times many automobiles are transported from the assembly plants frequently as deck loads. Practically none of this traffic would ever move by air. The same conclusion is reached for the traffic moving by inland waterways and by pipe lines.

Considering the 44 billion ton-miles carried by trucks, it is only necessary to call on one's own memory of the character of traffic that one sees in these trucks to realize what a small proportion would ever move by air. The trucking industry laid major emphasis on the advantage of door-to-door pickup and delivery. This was of added importance in short-haul traffic as the cost thereof was a larger percentage of the cost of the line haul.

Regarding the traffic of Railway Express, tests made indicate that of the 1,600,000,000 ton-miles of l.c.l. rail express moved in 1940, first-class matter comprised less than half of the total weight—to be exact, 49.4 per cent. The average first-class l.c.l. shipment weighed approximately 29 lbs. each, against an average for all classes of 41 lbs. As of October, 1939, 73.1 per cent of all first-class rail express shipments carried charges between 25 and 99 cents. For the first-class rail express shipments bearing charges of \$1 and over, the average weight was 68.5 lbs. and the average charge \$2.69. As of May, 1939, the average length of haul was 487.5 miles for l.c.l. rail express, and of this, the first-class rail express business that moved less than 350 to 450 miles produced 52.4 per cent of the shipments, 52.9

per cent of the weight, and 32.98 per cent of the gross revenue.

Ton-miles are not a well-adapted yardstick for measuring express traffic. Consequently, the Express Agency does not compile data on that basis. However, it is estimated that in 1940 the rail express business had an average gross revenue or charge to the public of 10½ cents per ton-mile for all classes of l.c.l. traffic. Making suitable allowance for the rate increase authorized in January 1942 would raise this figure to approximately 11 cents per ton-mile. For full carloads moving at that period by rail express, the gross transportation revenue is estimated at 3½ cents per ton-mile.

The volume of domestic air express in 1941 was 5,242,529 ton-miles, and for the first six months of 1942 was 4,738,985 ton-miles—an increase of 120 per cent over the similar six months' period of 1941. More ton-miles of air express and freight were flown in the pre-war years of 1937 and 1938 in the U. S. than were flown in any European or Central or South American country or Canada during those pre-war years with the possible exception of Russia. Furthermore, these figures on air cargo in the United States do not include excess baggage of air passengers, though such baggage is almost invariably included in European figures on cargo. Nor do the U. S. figures cited include the cargo flown to and from the U. S. on Pan American Airways,

with which Railway Express Agency also has a contract.

The rate of increase in the ton-miles of air freight and express flown in the U. S. since 1935 until the end of the fiscal year 1941 practically equaled the rate of increase in revenue passenger miles for that period, and the rate of increase for the revenue to the air companies from air cargo exceeded the rate of increase of passenger revenue for that period. The rate of increase of air cargo during those years far exceeded the rate of increase of air mail both in ton-miles and in revenue.

A number of analyses have been made by Railway Express in connection with increasing the traffic moved by air express. A very complete analysis was made in April, 1939, which included, in addition to the number of shipments of each commodity, the average weight and charge. An analysis was made in April 1941 of the number of shipments handled in the various commodities. In a table given below, the percentage of shipments was actual for the month of April, '41, but the average weight and average charge and the percentage the weights and charges bore to the whole were computed from the unit data obtained in April, '39.

The basis for rates for air express is controlled by the airlines with which Railway Express has contracts. The present air ex-

AIR EXPRESS ANALYSIS—APRIL, 1941

Commodity Groupings

Commodity Group	Avg. Weight	Avg. Charge	Shpts. (Actual)	Per Cent of Total Weight	Charges Computed
Machinery-Hardware	10.0	\$4.33	23.26	31.67	32.77
Printed Matter	13.6	3.38	15.11	28.06	16.62
Store Merchandise	5.0	2.78	13.39	9.25	12.09
Motion Picture Films	9.6	5.28	4.32	6.62	7.42
Electros-Matrices	4.2	2.04	6.11	3.51	4.07
Cut Flowers	5.0	2.91	3.63	2.48	3.44
Valuables	3.8	1.84	8.25	4.24	4.95
Miscellaneous	6.0	2.99	2.44	2.01	2.37
News Photos	1.3	1.21	4.42	.79	1.73
Drugs	5.4	2.53	1.46	1.08	1.20
Transcription Records—Radio					
Parts	3.3	1.90	4.53	2.04	2.80
Freight Manifests	2.7	1.52	4.36	1.61	2.15
Jewelry	2.1	1.64	2.60	.75	1.39
Food and Raw Samples	4.2	2.35	1.78	1.02	1.36
Optical-Camera	4.5	2.39	1.85	1.14	1.44
Personal Baggage	15.1	5.49	2.19	4.52	3.91
Liquor	5.1	2.95	.30	.21	.29
TOTAL	7.3	\$3.07	100.00	100.00	100.00

press rates set in 1934 are based on 4 cents per lb. per 100 miles (80 cents per ton-mile), plus an arbitrary which declines with both weight and distance. No arbitrary is in the rates for weights over 25 lbs. or for distances over 2,349 miles, above which distance there is no increase for additional mileage. Valuation charges are 10 cents per \$100, the same as in rail express. Higher charges are made on shipments with specific gravity less than 4 1/3 lbs. per cu. ft. There were 1,306,629 air express shipments and a gross revenue of \$4,277,070, which was an increase of 40.5 per cent over 1940. Net payments to the air companies were \$2,894,000.

The most recent figures for 1942 on air express show for August an average weight of 17.6 lbs., and preliminary estimates for September 129,026 shipments—an increase of 8.8 per cent over September 1941, with a gross revenue of \$923,028—an increase of 129 per cent, which gives an estimated average revenue per shipment of \$7.15.

Commodity air express rates at appreciable reductions from the base rate as established by the airlines of 4 cents per pound per 100 miles, which is 80 cents per ton-mile, have been filed with the CAB by the Express Agency from time to time. One of these rates produced a good volume of valuable traffic. Another produced no traffic at all. All such commodity rates were canceled during the summer of 1942 and may not be re-established until after the war. The most widely used commodity rate was the 40 per cent discount given on newspapers and magazines. This represents a base rate of 48 cents per ton-mile.

The rate on lobsters from Boston of approximately 50 per cent of the normal rate

was established in the spring of 1942; and, even though this was at the rate of about 40 cents per ton-mile, no traffic was obtained.

The lowest commodity rate established was on seafood from North Pacific points at about 26 1/2 cents per ton-mile. After several months of intensive development and advertising, this produced about 625 lbs. per month of new business for an average monthly revenue of about \$130.

Where Air Cargo Moves

Experience has shown that the heaviest flow by volume by air express is from the East to the West and from the North to the South. Even at the present time this direction of flow holds good.

The following table has been worked up to give some idea of the relative distance flow of express traffic, both in the rail service and in the air service. Data is not available to use the same measurements of volume of the traffic for both services. For both of these services the high quantities handled in the lower mileages will be noted. Undoubtedly much of the short-haul business was flown because the consignee desired same-day or same-night delivery. Frequency of service on the airlines contributed largely to building up this short-haul volume.

When Air Express Moves

Frequency of airplane service has been one of the factors that has led to the tremendous percentage increase of air express traffic. The following table indicates the frequency of service prior to the curtailment due to the war.

**Distances of Express Movements for Both
Rail Express and Air Express**

Miles	L.C.L. Rail Express Per Cent of Total Weight as of May '39	Air Express Per Cent of Total as of April '39	Revenue
	Shipments		
0- 349	56.6%	15.8%	8.77%
350- 649	18.0	18.1	12.50
650- 949	13.1	24.2	20.14
950-1249	5.9	12.6	12.61
1250-1549	2.9	5.4	6.09
1550-1849	1.2	3.4	4.36
1850-2149	0.6	6.1	8.56
2150 and over	1.7	14.4	26.97
	100.0%	100.0%	100.0%

**Air Express Schedules Each Weekday
Starting from New York as of
January 5, 1942**

New York to Chicago	30
" " Los Angeles	20
" " San Francisco	14
" " Miami	5
" " Detroit	16
" " Cleveland	16
" " St. Louis	8
" " New Orleans	8
" " Dallas	11
" " Washington	37
" " Boston	21
" " Seattle	22
" " Milwaukee	24
" " Twin Cities	24
" " Kansas City	12

From a survey made in March 1941 at 17 of the larger airports of the country and for all airlines with the exception of one principal north-and-south line, the number of flights on which air express could be flown is as given in the table below, together with the percentage of the weight of air express that was on board the planes at that time.

	Average Number Airplane Departures	Per Cent of Weight of Air Express
Midnight to 4 a.m.	30 flights	11.7
4 a.m. to 8 a. m.	56 "	14.3
8 a.m. to noon	99 "	10.0
noon to 4 p.m.	132 "	16.4
4 p.m. to 8 p.m.	133 "	19.4
8 p.m. to midnight	78 "	28.1

Tuesday, Wednesday and Thursday are usually the heaviest days of the week for handling air express, as shown by tests made in the pre-war period at LaGuardia Field. From 1934 to 1940, the highest poundage month fell three times in October, twice in September, once in November, and once in December. The highest poundage month for these years averaged a total tonnage of 36 per cent more than the average tonnage per month for the year.

Who Ships by Air

According to a traffic expert well versed in both air and surface transport, the pre-war air express traffic consisted largely of *articles or goods used in the process of production* rather than of ordinary consumer goods. The speed of the airplane is often of particular

value to the former, but except in certain circumstances of little specific value to the latter. This is due to the fact that consumer goods are generally produced in mass lots, and there usually is a period of storage either preceding or following distribution, or both; also a period of display before sale to the retailer, and, in most instances, a period of storage and display by the retailer before sale to the consumer. This generality is well borne out by the commodity grouping in the table previously given, from which it will be seen that in the pre-war days:

Machinery, hardware, and the heavy industries rated the highest in the actual number of shipments and percentage of total weight and charges. These shipments were by no means all repair or emergency parts, but, instead, the bulk of them probably were shortages required in production. The regularity with which these heavy industries furnished the most profitable shipments for air express forecasts that in the post-war period they will comprise an equally important factor. These industries under good business conditions work 24 hours, many of them seven days a week. They ship both day and night and demand immediate deliveries.

Printed matter, the next most frequent, heaviest, and most profitable commodity, includes newspapers and periodicals. The heaviest individual series of shipments ever made in the pre-war period was of magazines for nationwide distribution. Newspapers have moved between various cities in large volumes, and this traffic can be expected to increase. Magazines and newspapers can be considered as consumer goods and the shipment directed by the shipper. They move at various times of the day. They can be dropped by parachute, and frequency of schedules is particularly important in their movement. Many other items in the graphic arts industry are moved against time to fit into predetermined production schedules of sales, advertising, and public events in that fast-moving industry.

Electrotypes, matrices, and plates come under the same general classification as printed matter, but they are shipped not as consumer goods but as cog in the wheel of the printing industry. These move nationwide both day and night, and immediate delivery is required.

Store merchandise has probably received more intensive sales effort than any other commodity moving by air. The results have

been that while these shipments only accounted for 3 1/3 per cent of the shipments in 1934, they grew to 13 1/3 per cent in 1941. An appreciable volume of the L.c.l. freight and the first-class rail express business consists of this store merchandise.

On the extent that a greater volume of this will be flown may depend the degree of the success of post-war air cargo.

Even though most retail establishments are set up on the basis of buying in sufficiently large lots to secure wholesale prices and maintain a complete stock, yet in many of the high-priced specialty women's wear stores at considerable distance from the manufacturing centers, the practice of carrying skeleton stocks, making sales with model gowns displayed by mannequins, and when an order is placed by a customer, obtaining the desired color and size by air for next day delivery direct to the customer has become increasingly frequent and proved profitable for the stores. There are limitations to this, of course. On the other hand, smart merchandizing may lead to an expansion of this principle, because most stores make delivery of purchases the following day; and as air express can reach practically the entire country equally as fast, there is every hope that this business can be expected to continue to increase. Buyers filling in shortages on fast-moving lines add to the volume of store merchandise moving by air. These shippers apparently cannot be induced to use other than evening departures. They are content with daytime deliveries.

Motion-picture films moving regularly by air consist largely of the newsreels which are shipped, principally from New York, twice a week. These require very exact handling to reach the theaters at not later than the appointed time whether that be holidays or nights. Frequency of schedules and dependability of arrival are of paramount importance in this traffic. The traffic managers are well versed in the airline schedules, and as prints are completed and packed, they are dispatched in sequence according to the distance to be traveled. Practically all the newsreel companies ship on the same days and during the same hours. The quantities fluctuate depending on the news value of the releases.

Cut flowers have always been a good source of air traffic, and in the post-war period the volume of this business should increase to large proportions. The bulk of this traffic is

from growers and wholesalers to individual shops or to the wholesalers in the destination cities. This business is especially important in that it moves from California to the East, from Texas to the North, and from Florida along the Atlantic seaboard and to the Middle West. It constitutes one of the exceptions in the normal flow of air or rail express traffic. Growers are willing to cooperate on time of shipments, but there are limitations due to daylight picking. Most of the shipments require scheduled deliveries which cannot be met unless there is continuity of flight. Individual shipments of flowers as gifts or for funerals require exact timing, and delays cause ill will as well as the loss of potential patrons. More loss and damage claims and claims for delay arise from cut flowers than from any other commodity.

Valuables, jewelry, optical and photographic goods have always been an important part of the express business, and in air express they constitute an appreciable volume. Much of this traffic is closely timed and either for protection or for time of delivery requires special handling.

News photos and drugs do not comprise as large a percentage of the total of air cargo as they did in the early years. However, the volume of each has grown appreciably, and they contribute a worth-while percentage of the gross revenue. They are, invariably, timed shipments, and frequency of schedules is important in their handling.

Transcription records is one of the items that has shown a very rapid growth in the pre-war period. Shipment by air is well suited to the handling of this scheduled merchandise. Unfortunately they are exceedingly fragile and require careful handling. They are invariably a timed shipment, and frequency of schedules has done much to build up this traffic.

Personal baggage has shown a high average weight and revenue per shipment. It is one of the few commodities that actually are shipped by air by the man-on-the-street or the lady-of-the-house, and can therefore be classed as consumer shipments. However, many of these shipments of personal baggage have been in connection with other forms of transport—to meet steamship departures, or lost baggage and laundry, or articles left at hotels or in transit.

Very little food has moved by air for actual

sales purposes. The majority of such shipments have been for publicity purposes, or as samples or gifts. However, samples of food, together with raw samples of wool, cotton, nuts, coffee, silk, oil and other commodities, have formed and will continue to be a very important part of air cargo. These are not timed shipments. Frequently many are shipped at one time. They move counter to the flow of manufactured goods.

Why Shipments Are Made By Air

Practically all air shipments in the pre-war period were commercial shipments. The same may be expected in the post-war period. The only reason that such shipments are flown is that *the speed of flight returns a profit to the patron who pays the charges*. In the majority of cases it has been found that it is the consignee who specifies whether a shipment is to be flown or sent by other means. With the exception of some of the cut-flower business, the newspaper and magazine traffic, and a few other scattered instances, it is the consignee, not the shipper, who makes the decision as to whether the goods are to go by air or otherwise. The necessity of selling the consignee constitutes an important difference in the methods required to build up air cargo business and the sales methods and activities used for obtaining passengers or air mail. The consignees of the country are located in the million and a half retail establishments throughout the land. Selling these consignees requires not only personal acquaintance and some knowledge of their individual businesses, but also frequency and persistency in sales effort.

As previously stated, many of the bigger and better shipments move to or from points that are not located directly on the routes of the passenger airlines. This off-airline business shows the greatest rate of increase. With the perfection of equipment for picking up shipments while the airplane is in flight and discharging them without the airplane landing—as is now being done among the existing feeder-line routes—this off-airline business may be expected to increase. But selling the consignees in the smaller towns on feeder-line routes is a hard field to harvest, as frequency of service is not as great as on the more well-traveled air routes, and the high revenue shipments are of a size, weight, or commodity that cannot always be safely handled without landing.

In selling the million and a half potential consignees of air cargo, one of the points of greatest sales resistance has been *the degree of dependability of the shipments arriving at the time desired*. The coordination of rail express service with the air express service, as conducted by Railway Express Agency, has been an important factor in breaking down this item of sales resistance. The consignee knows that the shipment will continue to move by the fastest available means and will not be subjected to an avoidable delay. At some times of the year when flying conditions are adverse, this coordination of the traffic between rail and air express has comprised a very large percentage of the air shipments. Even when flying cargo planes with no passengers at all, it cannot be expected the airline executives will permit undue risks to be taken with their highly valuable airplanes, their personnel, and their cargo. Therefore, it appears essential for the growth of air cargo that the consignees can be truthfully assured their goods will continue to move towards them by the fastest means available regardless of interruptions to the air service.

Probability of Air Cargo Continuing to Move in Passenger Airplanes

The CAB supplemental answer to Senator George, made public in September 1942, included some data as to the possible growth of air transportation in the succeeding four years if the war had not interfered. In general this was to the effect that six billion revenue-passenger-miles on domestic airlines in 1946 would appear to be a conservative forecast. If an average annual operation of 400,000 miles is assumed per aircraft, and a load factor averaging 60 per cent, this would mean aircraft capacity of some 25,000 seats. Relating the above, it shows 10 billion seat-miles per year which, on the basis of 10 passengers and their baggage to a ton, represents one billion ton-miles capacity. The 60 per cent passenger load factor assumed leaves 40 per cent unused capacity or 400 million ton-miles unused capacity available for cargo.

If all first-class long-distance mail were sent by air plus the present volume of air mail, the total has been estimated by some as between 70 and 100 million ton-miles per year. Deducting this mail traffic would leave between 300 and 330 million ton-miles of unused capacity available for air cargo. The volume of air express in 1941 was 5¼ million

ton-miles. Thus there would be unused weight capacity available for air express and freight in addition to capacity for surcharged and unsurcharged mail equal to an increase of some 6,000 per cent of the ton-miles of air express and freight flown in 1941.

Similar conclusions are arrived at through a study of the survey made of the unused capacity available in airline passenger planes, made at seventeen of the larger cities in March 1941 by all of the airlines except one prominent north-and-south line. Such a study reveals that at that time the volume of air express and freight could have been increased approximately 22 times and still be within the permitted gross weight for the average departure.

An examination of the individual flights and route data in the Station-to-Station Airline Traffic Survey of the CAB for September 1940 goes far to bear out the principle outlined above—that on most flights an appreciable capacity is available for handling air cargo in addition to the average passenger load. For the fiscal year 1941 the revenue passenger load factor was 56.5 per cent. The average pay passenger load was 9.68. The following table roughly indicates the average loading:

Average Load per Revenue Airplane Mile Fiscal Year 1941	
Pay passengers 9.68 per plane	1936.0 lbs.
Mail load	293.3 "
Express load	68.2 "
Excess baggage load	18.4 "
<hr/>	
Total average load	2315.9 "

If one assumes the average pay load of a 21-passenger airliner at 4,500 lbs., it is seen that there was an unused capacity of 2185 lbs., which is 32 times the average amount of air express actually carried.

It is a well known principle that there is practically no difference in the direct flying cost when flying a plane partly loaded or when fully loaded. Hence the airlines that are in a position to carry air freight and air express on their regular passenger and mail planes have an opportunity to carry a vast volume of such traffic with little or no additional direct flying cost. This fact is so fundamental that in the opinion of many, it will be one of the major factors in determining the amount and

character of air cargo that will move in the post-war period.

To assure the type of equipment that can handle this volume of air cargo in the passenger planes economically and without detriment to schedules or causing inconvenience to passengers is one of the fundamental points which must be considered by aeronautical engineers and manufacturers in designing airline planes for that period.

Packaging for, and handling of, air cargo in and out of these planes must be included in such a study. To my mind it is reasonable to expect that at way-points between terminals the packaging and handling should be such that the *detention time for air cargo will not exceed the detention time for fueling, provisioning, and passenger interchange of, say, 10 minutes per stop.* Any detention time at way-points longer than this must be charged against the air cargo operation, but I am convinced that the aviation industry can develop vehicles that will be able to earn a substantial revenue through the otherwise unused capacity of passenger planes.

Packaging of Air Cargo

More work has been done on the packaging of cut flowers for transit by airplane than on any other commodity. Extensive tests have been conducted on the effects of freezing, high altitude, and high temperature.

* * *

The effect of a change in altitude on cans with various types of covers was tested on high altitude test flight made by United Air Lines. In all, 28 cans from a pint to a gallon in size were tested, some being $\frac{3}{4}$ full of water and some $\frac{1}{4}$ full. All cans, particularly those that were $\frac{3}{4}$ full, showed a pronounced bulge at 5,000 ft. elevation. The bulge increased greatly with the rate of climb, and at 5,000 ft. maximum expansion appeared to be reached. Screw top cans, pressure top, and single and double friction tops were tested. It would appear that with the exception of single friction top cans, all other types of closures may be transported without undue risks when filled and properly closed. From 10,500 ft. up all single friction top cans showed evidence of leakage.

Radium, thorium, and other radioactive substances including salts and liquids containing radium moved in considerable volume in air express service until it was found they might fog and thus damage undeveloped and unexposed films including moving picture and x-ray film. Considerable work was done in

endeavoring to ascertain the thickness of a lead shield that would be required to afford protection to photographic films at different distances and for varying lengths of time in transit. A large shipper reported about 67½ per cent of the radium shipments were 25 milligrams or less. The usual protection for this amount was 3 millimeters of platinum and 2 millimeters of lead. As the density of platinum is about twice that of lead, this would be equivalent to about 5/16" of lead. However, that did not give sufficient protection to films in the mail. Government tests indicated that 25 milligrams of radium at the center of a 1½" diameter sphere of lead would not fog films during 10 hours' exposure at 4' and 40 hours at 10'. This sphere would weigh a little over 7 lbs. and for more radium the protection might weigh up to 50 lbs. Radioactive substances lose strength rapidly, hence speed of transportation is important. Furthermore, speed of transit permits wider use of the limited basic supplies. As radioactive materials are not now permitted to be flown in mail planes, this is a commodity that could be flown in two directions in exclusive cargo planes if kept away from films.

Fur-bearing animals including chinchillas are flown from time to time to and from the breeding ranches. Occasionally dogs and other pets have been flown, but it is not convenient to handle and give proper care to live animals in combination passenger planes. Baby chicks and turkeys are handled in great volume in rail express and these might constitute a commodity to be flown from California to the Middle West. They are vulnerable to drafts and excessive heat or cold. Pan American Airways has flown large quantities from Miami to Caribbean points that could be reached in less than 48 hours from the time of hatching.

Specific Gravity of Air Cargo

In response to numerous inquiries on the present-day average weight of air express shipments, a spot test was made at LaGuardia Field in November, 1942. Designers and operators will find these unit weights of various commodities useful in calculations for post-war traffic by combining them with the percentage of commodities expected to comprise the post-war lading. Since these shipments were measured individually, allowance should be made for voids when they are stowed and secured for transit in the airplanes.

Specific Gravity of Various Air-Borne Commodities LaGuardia Field, New York, November, 1942

	Lbs. per Cu. Ft.
Printed matter	35.6
Magazines	34.9
Bank shipments	25.7
Blueprints	18.4
Electrotype plates, matrices	20.9
Photographs (bulk)	34.6
Films in cartons	49.0
Radio Records—glass in carton	9.3
Yeast	111.5
Store Merchandise	9.0*
Shoes	9.0
Hats	1.5
Furs	4.6
Personal	15.9
Chemicals & Serums	11.4
Jewelry—watches and lenses	15.1
Heavy industries—hardware and tools	36.9**
Aircraft materials	22.7***

* Store goods ranged from 4 lbs. per cu. ft. for lingerie to 21.3 lbs. for piece goods.

** Heavy industries ranged from 8.4 lbs. for V belts and 8.3 lbs. for marine engine parts to 150 lbs. per cu. ft. for tools.

*** Aircraft manufacturers ranged from 7 lbs. per cu. ft. for magnetic material to 62.4 lbs. for parts.

Under the present domestic air express tariffs standard rates are applied when the cubic measurement of a shipment does not exceed 400 cu. in. per lb. Over that, charges are made on the basis of 1 lb. for each 400 cu. in. Thus shipments with specific weight of less than 4.3 lbs. per cu. ft. are charged for by volume.

Handling of Air Cargo

It will be clear from the foregoing there is every reason to expect a large portion of the post-war air cargo will be carried in passenger planes. Undoubtedly mail will also be carried in these planes. But the following suggestions will apply for either exclusive cargo planes or combination planes. To obtain a fast turn-around of the planes and provide for their being in flight a maximum number of hours per day, the time for loading and unloading at the terminals must be a minimum.

Mechanized equipment will be required, and in the selection of this equipment, thought should be given to utilizing or adapting equipment which has been developed for somewhat

similar work. Two generic types of equipment will be required—containers, and conveyors. Neither of these is new to the aviation industry, particularly the manufacturers. As applying containers and conveyors to airline use, the following detailed suggestions are extended:

Containers in the form of bags are familiar to airline operators through their use in air mail and air express. However, bags have such outstanding disadvantages their use in the present manner cannot be continued and still gain the objectives desired. The disadvantages include the difficulty of moving a number of sacks at one time unless they are on a wheeled vehicle; they will not ride a roller conveyor; the size of a bag is definite and inflexible; bags offer no protection to contents from crushing; loading bags with packages is a slow process; they require special racks to hold them open while being loaded. These disadvantages outweigh the advantages of being cheap, light, durable, readily repaired, and of occupying minimum space when empty.

Characteristics for the design and construction of air borne containers should cover:

Light weight, inexpensive, and reusable. Able to resist rough handling; be readily repairable.

Strength to protect lading; cover to retard pilferage.

Shaped to facilitate quick loading with minimum of voids.

Should fold or nest to occupy minimum space when empty.

Of such uniform size as best adapted for use on various planes; endeavor have each carry approximately uniform weight of lading which might be 500 lbs. for exclusive cargo planes or less for combination planes.

Pliant cover to hold load in place and permit volume of lading to exceed rigid outline of container.

Self-attached means for quickly anchoring the container.

Should be designed for use in conjunction with means enabling one man to readily move loaded container.

The experience of Railway Express with containers backs some of the above conclusions. That company for many years has used wooden packing trunks by the thousand, also some of piano box size on casters. Several years ago it standardized for new containers on a canvas container mounted on a spring steel frame with skids below, which would ride a roller

conveyor. These can be made so that they may be nested, when empty, like bushel baskets. The size found most useful for rail work was approximately 14 cu. ft., slightly over 2 ft. wide, 2 ft. high, and 3 ft. long. For air cargo, fitting this type of container with a pliant cover, with means for readily and quickly anchoring it to the floor of the airplane, and means for readily moving it within the airplane have all been worked out and are under process of further test and development. Other forms of container construction may encompass the desideratum previously outlined. It will be found that speed of loading, unloading and securing cargo in the plane, moving the cargo to the appointed position dictated by the weight balance required will be sufficiently expedited by the use of containers as to offset the tare weight thereof.

For conveyors, it is certain the magnesium roller conveyors, as introduced by Railway Express, will be found of utmost use both in expediting the handling and in lightening the labor required, as well as in decreasing the damage to shipments. Jervis B. Webb Co. collaborated wholeheartedly in this development; and during the three years preceding the war, Railway Express has equipped over 200 terminals with these magnesium conveyors, using in all about 27,000 linear feet. Railway Express before the war was probably the largest domestic user of extruded, heat-treated Dow shapes. With 18-in. rollers on 4-in. centers, supported by 3½-in. channel side frames, these conveyors weigh approximately 7 lbs. to the linear foot. They are so light one man can instantly move them as the position of the lading changes. For airline work there is the added advantage that without serious weight penalty they may be air borne on the floor of the airplane with the cargo resting thereon in anchored light-weight containers.

Combined use of these two pieces of equipment—light-weight air-borne containers, and light-weight air-borne roller conveyors—provides means for one or two men, at a way-station, to unload the one or more containers bound for that station, then load into the plane, place at the position designated by the pilot, and anchor the containers which are put on at this way-station within the time limitation for fuel and passengers. Placing mail sacks in these containers and thus handling several sacks as a unit expedites their movement. Eventually a messenger will work in the container compartment of the airplane, transferring shipments between containers, then moving on the roller conveyor the container to be



Railway Express names new regional cargo heads, or Air Express Managers: M. G. Lickfeig, San Francisco; V. M. Grimsley, Atlanta; Ralph W. Starkey, New York, and P. H. Cummings, Chicago (l. to r.)

unloaded into position near the door for rapid discharge when the plane lands.

The use of roller conveyors as described above is applicable when the floor of the vehicle used to move the lading to plane side is approximately the same height as the cargo door of the airplane. Accidental damage to the airplane and cargo door will be decreased if the plane side vehicles are not permitted to back up closer than several feet from the plane. The light-weight roller conveyors will be found a convenient method for bridging the gap between the tailgate of the vehicle and the plane as well as for extending into the plane for handling cargo inside. When large volumes of cargo are to be handled, it will be found faster and more economical to use good-sized individually-powered trucks or over-the-road trailers to move the lading to and from plane-side rather than a number of smaller units. The ability to drive a street truck to plane-side at practically any airport is an advantage in the handling of cargo by airplane that is not possible at most terminals where cargo is assorted and loaded on surface transportation vehicles.

When the cargo door of airplanes is elevated far above the ground, means must be provided for elevating the cargo. Of the several methods for elevating the cargo, three seem the most practical; namely, towing a portable elevator to plane side and placing the lading on the elevator; a truck with a good-sized elevating body such as is used for re-icing refrigerator cars, which unit has the advantage of being able to transport a load to plane-side as well as elevate it; and inclined slat conveyor mounted on a light-weight truck chassis with

power take-off, the height of the conveyor being adjustable at the upper end to suit the elevation of the cargo door and the lower elevation to suit the tailgate height of the feeding trucks. This unit can be provided with walkways on both sides and a light-weight roller extension into the plane itself. When large quantities are to be loaded and unloaded, the continuous flow principle will handle more tons per hour than will be possible with the intermittent movement of either an elevator or an elevating truck.

The aviation industry as a whole has the opportunity now to work out the most efficient methods for cargo handling. But these can only be arrived at by a closely coordinated and combined effort of the airplane designers, the airline operating officials, the traffic men who are to obtain the lading, and engineers experienced in the physical handling of the type of traffic that is foreseen for the post-war period. A clean drawing board awaits the aeronautical members of the Society of Automotive Engineers for this development.

American, Continental Win 'Aviation' Awards

To American Airlines and Continental Airlines went the annual awards for excellence of maintenance posted by *Aviation*, at a dinner in Chicago on Dec. 9 sponsored by the Air Transport Assn. of America.

Maintenance Chiefs J. F. Martin, of American, and Stanley E. Shatto, of Continental, were the proud recipients for their lines.



SAE Journal Photo

Igor Sikorsky, Vought-Sikorsky Aircraft Division, United Aircraft Corp., famed developer of the helicopter and Hon. William A. Burden, special assistant to the Secretary of Commerce, in charge of aviation, talk things over at the SAE Air Cargo Meeting in Chicago last month. Mr. Burden assisted in development of the meeting and was chairman at an important session. He was also one of Air Transportation's first contributors, writing in the first issue last October.

Beech Aircraft Workers Putting 20% of Pay Into U. S. War Bonds

Enough U. S. War Bonds to pay for 150 twin-engine Beechcraft advanced training planes were purchased by employees of Beech Aircraft Corp. during the first ten months of 1942, it was revealed in a report submitted to the Treasury by Beech. More than 145,000 bonds, in denominations from \$25 to \$1,000, were bought by Beechcrafters from Jan. 1 to Nov. 8.

The plane-builders virtually doubled the Treasury Department's suggested quota of 10 per cent of earning. They put 19.91 per cent into bond purchases, under a special payroll deduction plan in which employees unanimously participated.

"Taking into consideration the many thousands of dollars worth of additional War Bonds and Stamps which Beechcrafters are buying outright for cash in addition to their payroll deduction purchases, we are sure that our people are putting better than 20 per cent of their incomes into War Bonds," said O. A. Beech, secretary and treasurer.

AIRCRAFT PARTS DEVELOPMENT CORP., Summit, N. J., announces that R. M. Ellis has joined it as chief mechanical engineer after 20 years in research and product design with Brewer Tichenor Corp., Remington-Rand, Inc., Pathe Film Corp. and Conmar Products Corp.

Domestic Air Express Rate Schedule

A handy table for finding approximate shipping costs

Total cost between addresses in airport cities—No extras

Distances in Air Miles	WEIGHT IN POUNDS										
	1	5	10	25	50	100	200	250	350	500	1000
200.....	\$1.00	\$1.12	\$1.32	\$2.00	\$4.00	\$8.00	\$16.00	\$20.00	\$28.00	\$40.00	\$80.00
400.....	1.00	1.44	2.04	4.00	8.00	16.00	32.00	40.00	56.00	80.00	120.00
600.....	1.00	1.76	2.76	6.00	12.00	24.00	48.00	60.00	84.00	120.00	160.00
800.....	1.00	2.08	3.48	8.00	16.00	32.00	64.00	80.00	112.00	160.00	240.00
1000.....	1.00	2.40	4.20	10.00	20.00	40.00	80.00	100.00	140.00	200.00	300.00
1500.....	1.00	3.20	6.00	15.00	30.00	60.00	120.00	150.00	210.00	300.00	450.00
2000.....	1.00	4.00	8.00	20.00	40.00	80.00	160.00	200.00	280.00	400.00	600.00
2500.....	1.00	4.80	9.60	24.00	48.00	96.00	192.00	240.00	336.00	480.00	720.00

QUOTES of the MONTH

Col. Harold R. Harris, Chief, Plans Division, Air Transport Command, to the SAE Air Cargo Meeting in Chicago (see also page 2B): "The Air Transport Command's ton-mileage for one recent month was greater than the combined figure for all the airlines of the U. S. for the entire year 1941 . . . Our world air routes now add up to more than 60,000 miles, which can be compared to the pre-war total of 41,000 miles for all domestic airlines in the U. S." Biggest obstacle to prodigious further expansion of Army air cargo, according to Colonel Harris: the fact that plane fuel cannot yet itself be transported in quantity by air.

Peter van den Toorn, Managing Director, Holland-America Line, in an interview with New York reporters: ". . . It undoubtedly will be a fact that before long express goods will be shipped by air, but that there will be any large volume of cargo

moving by air for many years to come seems highly improbable. A great many commodities can be shipped only in bulk, as the transportation cost is a prime factor . . . and the time element does not enter into consideration."

Major Al Williams, Aviation Writer for the Scripps-Howard Newspapers, on dirigibles as aircraft carriers and cargo carriers: "The aircraft-carrier dirigible would . . . be immune to the one weapon which has busted most surface carriers to date—the deadly torpedo launched from plane to submarine. Another thought in favor: Our greatest problem today, in view of the sub sinkings . . . is the transportation of munitions. Does anyone know of an air vehicle which can transport 30, 40 or 50 tons of cargo at a clip for five or six thousand miles except a dirigible? And the war dirigible would have a predominant value in a postwar world."



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LETTERS to the Editors

London Calling

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London, England
(via RCA Radiogram)

From Time to AT . . .

I am sorry I haven't had an earlier opportunity to tell you what a forward-looking step your new *AIR TRANSPORTATION* . . . is. I am sure it will fill a very real need as a forum for the interchange of opinion about cargo by air.

Here's wishing you lots of luck in your new venture.

P. I. PRENTICE
Publisher
Time
New York, N. Y.

"Air-Conditioning" Youth

Your article on the course that Iowa Wesleyan College (*AIR TRANSPORTATION*, October 1942) is giving to "air-condition youth for the air-cargo age," was of special interest to me. You see, I am just completing instruction in a course in air transportation at the University of Washington. This course has been given here once a year as an advanced transportation course since 1937. It was started by Professor Raymond F. Farwell (now Commander, U. S. Naval Reserve, on active duty) in 1935, as a part of a combined air and highway course.

This year, for the first time, a text is available, *Air Transportation* by Claude Puffer, which covers very thoroughly the economics of air transportation and economic regulation. Lecture material has supplemented the text by furnishing historical background and information of current interest concerning development of meteorology, motors, planes, airlines and air cargo. Guest speakers have been chosen from important phases of the air transportation industry: United Airlines, Pan American Airways, Northwest Airlines, Railway Express Agency and Civil Aeronautics Authority. Last but not least, the students in this course have pursued an independent re-

search project, chosen by themselves, upon some phase of the air transportation industry. They have become very much interested in their projects and some remarkably fine work has been the result.

The class is made up of 35 students (three young women), the majority of whom are transportation majors. Many of these students hope sometime to be connected with an airline. (Two of the young women are transportation majors and they are both aiming at airline work.) We feel that we have a good start in this subject of air transportation here at the University of Washington, and, war conditions permitting, hope to further expand it next year.

Permit me to congratulate you on the very fine publication, dedicated to the air cargo business, that you are putting out. I have asked that our department place an order, immediately, for our future use.

G. L. GIFFORD
Lecturer in Transportation
University of Washington
Seattle, Wash.

AT Hears from ATA

I believe your publication has a great opportunity to cover one phase of air transportation which is not only becoming more important day by day, but which will be extremely important in the future.

M. F. REDFERN
Executive Secretary
Air Transport Assn. of Amer.
Washington, D. C.

Shippers & Agents Speak

May I extend to you my congratulations for your enterprising undertaking in publishing *AIR TRANSPORTATION*. The publication is both timely and necessary.

NORHAM MENDELSSOHN
Mendelssohn Brothers, Ltd.
Customs House Brokers and
Shipping Agents
Montreal

I had the pleasure of reading the October issue of *AIR TRANSPORTATION* which I found very interesting.

Some time ago, I had the occasion to read

LETTERS to the Editors

an organization magazine put out by Bullock's, one of Los Angeles' Department Stores, for the month of April 1926, and in that booklet I found an article written on "Aerial Transportation" by Mr. Fred W. Ashton, general traffic manager of Bullock's, which was originally written by that gentleman for *Western Flying Magazine*. It was very interesting to note that Mr. Ashton's remarks and his foresight as far back as 1926 are being put into operation.

I am enclosing herewith copy of "The Bullock Way," dated April 1926, which carries Mr. Ashton's article on page 22, thinking perhaps you might be interested.

H. C. RAUSCH
Manager
National Carloading Corp.
Los Angeles, Cal.

To Reader Rausch, the Editors send their heartiest thanks. He will find his interest rewarded on page 12, where, in this issue, is printed Mr. Ashton's amazingly foresighted view of 16 years ago, together with some added observations as of today.—Ed.

Congratulations, Cont'd

May I take this opportunity to congratulate you on your very fine initial issue. It is my feeling that AIR TRANSPORTATION will fill a very important niche in the publishing field just as transportation by air will dominate our post war economy.

L. B. GATCHELL
Editor
The Airpost Journal
Bronxville, N. Y.

I have now read "Air Cargo and the War" (AIR TRANSPORTATION, November 1942) and think it is very well done. You are to be congratulated on a good piece of work.

E. E. WILSON
President
United Aircraft Corp.
East Hartford, Conn.

We were pleased to receive . . . your timely new . . . AIR TRANSPORTATION. The text was especially interesting to me as I have been

closely watching developments in the field of international cargo transportation.

HARRY W. FRANTZ
Associate Director
Press Division
Coordinator of Inter-
American Affairs
Office for Emergency
Management
Washington, D. C.

You're to be congratulated on the first issue of AIR TRANSPORTATION and the timing of the first issue was certainly grand. I picked up a copy at the Foreign Commerce Show in Boston . . . and the book couldn't have appeared at a better time or place.

C. A. STEVENS, JR.
Advertising Dept.
American Airlines Inc.
New York, N. Y.

The first issue of AIR TRANSPORTATION . . . is timely, interesting and stimulating.

As I started *Aviation* magazine and published it for 12 years, I am naturally interested in any new effort in the aeronautical publication field.

LESTER D. GARDNER
Executive Vice President
Institute of the Aeronautical
Sciences, Inc.
New York, N. Y.

. . . you have done a fine job of printing material on transportation of cargo by air.

Permit me to wish you every success in your new undertaking.

K. N. MERRITT
General Sales Manager
Railway Express Agency Inc.
New York, N. Y.

I want to take this opportunity of wishing you success in your new venture in publishing AIR TRANSPORTATION. We will appreciate your sending up a copy. . . .

ROSCOE M. GREENE
Vice President
North Atlantic & Gulf
Steamship Co.
New York, N. Y.

SCALE OF RATES GENERALLY IN USE IN AMERICAN MARINE INSURANCE MARKETS FOR MAIL AND AIR SHIPMENTS

Replacing Schedule Dated December 16, 1942

(Subject to withdrawal without notice and subject to all the provisions of the current war risk rate schedule)

A—Registered Mail, excluding Registered Airmail and Air Express Rates by Registered Mail

Non-negotiable securities (warranted full value declared for insurance)—37½% of Cargo Rates. Securities (except as provided above), documents and similar interest—75% of Cargo Rates.
Currency including jewelry, precious stones, precious metals, etc., also miscellaneous cargo—100% of Cargo Rates.

B—Registered Airmail and/or Air Express including Miscellaneous Cargo by Air Western Hemisphere (excluding shipments between points in Continental United States and/or Canada except as noted below)

All classes of property

1. Sendings between points in western Hemisphere not south of a line between Lima on the West Coast of South America and Paramaribo on the North Coast of South America (including Bermuda)		25c%	
except			
United States to from Havana or Nassau		10c%	
United States to from other West Indies		15c%	
West Indies to West Indies		12½c%	
United States to from Mexico		15c%	
United States or Canada to from Prince Edward Island, Newfoundland		10c%	
United States or Canada to from Victoria, B. C.		10c%	
United States or Canada to from Alaska not west of the railroad between Seward and Fairbanks, also between places in Alaska not West of the railroad between Seward and Fairbanks		20c%	
United States or Canada to or from other places in Alaska not beyond Unimak Pass		¾%	
United States to from Hawaii		40c%	
Hawaiian interisland shipments by Air (including shipments by bombers)		25c%	
2. Sendings between points in Western Hemisphere south of a line between Lima on the West Coast of South America and Paramaribo on the North Coast of South America		25c%	
3. Sendings from points in North America to points on the West Coast of South America south of Lima, and vice versa		37½c%	
4. Sendings from points in North America to points on the East Coast of South America south of Paramaribo, and vice versa		50c%	
Transatlantic—North	(*) *	(b) *	(c) *
1. U. S. to from Lisbon	2%	1½%	¾%
Rates add'l to above for connecting air service, Lisbon to from Spain			
2. United States to British Isles or Eire	3%	2¼%	1¼%
3. United States from British Isles or Eire	5%	3¾%	1¾%
4. United States to Iceland	7½%	5¾%	2.81¼%
5. United States from Iceland	10%	7½%	3¾%

Transatlantic—South

1. United States to from West Africa not North of Monrovia via Natal 1½% (Quoted application)
2. United States to from South Africa via Monrovia & Natal 2% (Quoted application)

Egypt and India

1. United States to from Egypt 7½% (Quoted application)
2. United States to from India 10% (Quoted application)

* (a) Miscellaneous Cargo, Currency, jewelry, precious stones, precious metals, etc.

* (b) Securities.

* (c) Non-negotiable securities (warranted full value declared for insurance).

C—Ordinary Parcel Post, Government Insured Parcel Post, Registered Post, Ordinary Mail (Excluding Air Mail)

- (A) United States or Canada to from Australasia, Hawaiian and other Pacific Islands—Transpacific Cargo Rate.
- (B) U. S. to from United Kingdom, Eire, Portugal, Spain, Africa, Near East, Far East Newfoundland, Iceland, Greenland, Bermuda—Cargo Schedule Rate to from New York but with respect to shipments to or from Spain under policies endorsed with the airborne clause, the Lisbon rate will be charged plus an additional charge of 50% of the connecting Air Service rate quoted in Section (B) because of the possibility that shipments of valuables may go forward to or from interior points by Air.
- (C) U. S. West of Rockies to from Costa Rica, Panama, Panama Canal Zone, Colombia, Ecuador, Peru, Bolivia and Chile—Cargo Schedule Rate for Pacific voyages to from San Francisco.
- (D) U. S. West of Rockies to from Venezuela, Guianas, Brazil, Paraguay, Uruguay, Argentina—Cargo Schedule Rate via Panama to from San Francisco.
- (E) U. S. East of Rockies to from Costa Rica, Panama, Panama Canal Zone, South America, West Indies (except Bermuda)—Schedule Rate to from United States Gulf.
- (F) U. S. West of Rockies to from Mexico, British Honduras, Guatemala, Republic of Honduras, El Salvador & Nicaragua—25% of Schedule Cargo Rate for Pacific voyages to from San Francisco.
U. S. East of Rockies to from Mexico, British Honduras, Guatemala, Republic of Honduras, El Salvador & Nicaragua—25% of Schedule Cargo Rate to from United States Gulf.

Note: Reduced percentage provided assured agrees to pay this percentage on all shipments: otherwise individual shipments on Facultative Basis

If to or from Points West of Rockies

If to or from Points East of Rockies

Cargo Schedule Rate for Pacific voyages to from San Francisco

Cargo Schedule Rate to from United States Gulf

Rates in this Section are not subject to revision, either upward or downward, should the actual route of the shipments become known.

D—Express (Excluding Air Express)—Charge Cargo War Risk Schedule Rates.

Note: Sec. "C" is new other changes underlined. Note deletion of Switzerland.



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International Express and Mail Tables

Express rates quoted are from the U. S. international airport of departure and are based on the latest prevailing tariffs. Shippers are warned, however, that they are subject to change.

Bro—Brownsville
Cg—Chicago
Eo—El Paso
Fv—Fort Worth
Gf—Grand Forks
Lgs—Los Angeles
Mia—Miami
Nyk—New York
Sq—San Diego
Ste—Seattle

International Air Express is subject to two charges: one a charge per pound weight or measurements at carrier's option (200 cu. in. to the pound of weight), the other a charge per \$100 of valuation. The two must be added on any shipment to determine the cost. Neither includes the cost of insurance, which may be purchased by the shipper from the carrier or otherwise.

Priorities: The air carriers warn all shippers that express traffic, both U. S. Government and commercial, is so heavy that no guarantee can be given that any shipment will depart on any particular plane unless it en-

joys U. S. priority. Otherwise it will depart, in relation to other shipments, in the order received at the international airport used, subject to wartime limitations. Shippers should forward cargo to international airports as far in advance of desired departure as possible and should communicate via **Railway Express Agency, Inc.** with the international air carrier as to whether the shipment can be forwarded without priority, as shipments without priority for certain countries are, at present, under embargo. (On cargoes to be shipped via American Export Airlines, Inc., shippers should inquire at their office, Room 920, 25 Broadway, New York.)

International air carriers whose schedules and rates are included here are indicated by the letter following the symbol for the airport: A—American Airlines, Inc.; C—Colonial Airways; E—American Export Airlines, Inc.; P—Pan American Airways System and affiliate T—Trans-Canada Air Lines. NW—Northwest Airlines, Inc. U—United Air Lines

Destination	U. S. Gateway & Airline	RATES		Depart	Mail per 1/2 Oz.
		Per Lb.	Per \$100 Value		
LATIN-AMERICA LINES					
Antilla, Cuba.....	Mia P	.24	.25	Dly ex W, Sa	.10
Antofagasta, Chile.....	Mia P	1.26	.50	M, W, Th, Sa	.40
"	Bro P	1.34	.50	M, Tu, Th, Sa	.40
"	Lgs P	1.95	.50	Su, M, W, F	.40
Aracaju, Brazil.....	Mia P	1.26	.50	Su, Tu	.40
"	Bro P	1.71	.50	Su, F	.40
"	Lgs P	2.23	.65	Th, Sa	.40
Areia Branca, Brazil.....	Mia P	1.24	.50	Su	.40
"	Bro P	1.56	.50	P	.40
"	Lgs P	2.13	.50	Th	.40
Arequipa, Peru.....	Mia P	1.23	.50	Dly ex F	.30
"	Bro P	1.26	.50	Dly ex W	.30
"	Lgs P	1.93	.50	Dly ex Tu	.30
Arica, Chile.....	Mia P	1.25	.50	M, W, Th, Sa	.40
"	Bro P	1.26	.50	M, Tu, Th, Sa	.40
"	Lgs P	1.94	.50	Su, M, W, F	.40
Asuncion, Para.....	Mia P	1.73	.50	Su, F	.40
"	Bro P	1.86	.50	W, F	.40
"	Lgs P	2.43	.65	Tu, Th	.40
Bahia, Brazil (See Sao Salvador)					
Balboa, Canal Zone.....	Mia P	.76	.40	Dly	.15
"	Bro P	.90	.40	Dly	.15
"	Lgs P	1.45	.50	Dly	.15
Baracoa, Cuba.....	Mia P	.28	.25	Dly ex Sa	.10
Barcelona, Venezuela.....	Mia P	.85	.40	Dly	.25
"	Bro P	1.17	.50	Dly	.25
"	Lgs P	1.78	.50	Dly	.25
Barranquilla, Columbia via Kingston	Mia P	.61	.40	Su, W, F	.35
via Balboa.....	Bro P	1.03	.40	Dly	.35
"	Lgs P	1.59	.50	Dly	.35
Bauru, Brazil.....	Mia P	1.58	.50	Su	.40
"	Bro P	1.71	.50	Th	.40
"	Lgs P	2.28	.65	W	.40
Belem, Brazil (See Paraquay)					

Destination	U. S. Gateway & Airline	RATES		Depart	Mail per 1/2 Oz.
		Per Lb.	Per \$100 Value		
Bello-Horizonte, Brazil.....	Mia P	1.65	.50	Su, W, F	.40
"	Bro P	2.13	.50	M, W, F	.40
"	Lgs P	2.69	.65	Su, Tu, Th	.40
Buenos Aires, Argentina.....	Mia P	1.56	.50	Dly	.40
"	Bro P	1.70	.50	Dly ex W	.40
"	Lgs P	2.26	.65	Dly ex Tu	.40
Cali, Col. via Balboa.....	Mia P	.89	.40	Dly	.35
"	Bro P	1.03	.40	Dly	.35
"	Lgs P	1.59	.50	Dly	.35
Camaguey, Cuba.....	Mia P	1.22	.25	Dly	.10
Camocim, Brazil.....	Mia P	1.22	.25	Su	.40
"	Bro P	1.50	.50	F	.40
"	Lgs P	2.05	.50	Th	.40
Campeche, Mexico.....	Mia P	.41	.25	W	.10
"	Bro P	.51	.40	Dly	.10
"	Lgs P	1.00	.40	Dly	.10
Campo Grande, Brazil.....	Mia P	1.48	.50	Su, W	.40
"	Bro P	1.61	.50	M, W, Sa	.40
"	Lgs P	2.18	.50	Su, Tu, F	.40
Canavieiras, Brazil.....	Mia P	1.33	.50	Su, Tu	.40
"	Bro P	1.81	.50	Su, F	.40
"	Lgs P	2.38	.65	Th, Sa	.40
Caracas, Venezuela (See La Guaira)					
Caravelhas, Brazil.....	Mia P	1.36	.50	Su	.40
"	Bro P	1.85	.50	F	.40
"	Lgs P	2.41	.65	Th	.40
Caripito, Venezuela.....	Mia P	.89	.40	Dly	.25
"	Bro P	1.19	.50	Dly	.25
"	Lgs P	1.80	.50	Dly	.25
Cayenne, Fr. Guiana.....	Mia P	1.02	.40	Su	.30
"	Bro P	1.26	.50	Sa	.30
"	Lgs P	1.91	.50	F	.30
Cayo Mambi, Cuba.....	Mia P	.26	.25	Dly ex Sa	.10
Chetumal, Mexico.....	Mia P	.55	.40	W	.10
"	Bro P	.55	.40	M, F	.10
"	Lgs P	1.04	.40	M, F	.10
Chiclayo, Peru.....	Mia P	1.11	.50	Dly	.30
"	Bro P	1.19	.50	Dly	.30
"	Lgs P	1.81	.50	Div ex Tu	.30

Destination	U. S. Gateway & Airline	RATES		Depart	Mail per 1/2 Oz.
		Per Lb.	Per \$100 Value		
Cienfuegos, Cuba.....	Mia P	.28	.18	Su,W,F	.10
C. del Carmen, Mexico.....	Mia P	.45	.25	W	.10
"	Bro P	.47	.40	Dly	.10
"	Lgs P	.94	.40	Dly	.10
Ciudad Trujillo, D. R.....	Mia P	.45	.25	Dly	.10
Cochabamba, Bolivia.....	Mia P	1.29	.50	W,Sa	.35
"	Bro P	1.35	.50	M,Th	.35
"	Lgs P	1.95	.50	Su,W	.35
Concepcion, Bolivia.....	Mia P	1.31	.50	Sa	.35
"	Bro P	1.45	.50	Th	.35
"	Lgs P	2.03	.50	W	.35
Cordoba, Argentina.....	Mia P	1.40	.50	Dly ex F	.40
"	Bro P	1.63	.50	Dly ex W	.40
"	Lgs P	2.19	.50	Dly ex Tu	.40
Coro, Venezuela (via Barranquilla)	Mia P	.74	.40	Su,W	.25
"	Bro P	1.11	.50	Dly	.25
"	Lgs P	1.69	.50	Dly	.25
Coro, Venezuela (via Maracaibo)	Mia P	.74	.40	Tu,Sa	.25
Corumba, Brazil.....	Mia P	1.41	.50	Su, W	.40
"	Bro P	1.56	.50	Tu,Sa	.40
"	Lgs P	2.13	.50	M,F	.40
Cristobal, Canal Zone.....	Mia P	.76	.40	Dly	.15
"	Bro P	.92	.40	Dly	.15
"	Lgs P	1.46	.40	Dly	.15
Cuenca, Ecuador.....	Mia P	1.06	.40	Su,W,F	.30
"	Bro P	1.15	.50	M,W,F	.30
"	Lgs P	1.76	.50	Su,Tu,Th	.30
Curitiba, Brazil (Via Rio)	Mia P	1.60	.50	Su,W,F	.40
"	Bro P	2.00	.50	M,W,Sa	.40
"	Lgs P	2.58	.65	Su,Tu,F	.40
David, Panama.....	Mia P	.82	.40	Dly	.15
"	Bro P	.85	.40	Dly	.15
"	Lgs P	1.38	.50	Dly	.15
Emeraldas, Ecuador.....	Mia P	.99	.40	W	.30
"	Bro P	1.11	.50	M	.30
"	Lgs P	1.71	.50	Su,W	.30
Florianopolis, Brazil.....	Mia P	1.63	.50	Su,W,F	.40
"	Bro P	2.11	.50	M,W,F	.40
"	Lgs P	2.68	.65	Su,Tu,Th	.40
Fort de France, Martinique.....	Mia P	.71	.40	Su,Sa	.15
"	Bro P	1.16	.50	M,F	.15
"	Lgs P	1.78	.50	Su,Th	.15
Fortaleza, Brazil (Ceara)	Mia P	1.23	.50	Su,Tu,Th,Sa	.40
"	Bro P	1.54	.50	Su,Tu,Th,F	.40
"	Lgs P	2.10	.60	M,W,Th,Sa	.40
Georgetown, British Guiana.....	Mia P	.90	.40	Tu,Sa	.20
"	Bro P	1.24	.50	Th,Sa	.30
"	Lgs P	1.83	.50	W,F	.30
Guadalajara, Mexico.....	Bro P	.43	.25	Dly	.10
"	Lgs P	.59	.40	Dly	.10
Guantanamo, Cuba.....	Mia P	.28	.25	Dly ex Su	.10
Guatemala City, Gua.....	Mia P	.74	.40	Dly	.12
"	Bro P	.53	.40	Dly	.12
"	Lgs P	1.08	.50	Dly	.12
Guayaquil, Ecuador.....	Mia P	1.04	.40	Dly	.30
"	Bro P	1.15	.50	Dly	.30
"	Lgs P	1.75	.50	Dly	.30
Havana, Cuba.....	Mia P	.20	.18	Dly	.10
Hermosillo, Mexico.....	Bro P	.77	.40	Dly	.10
"	Lgs P	.24	.25	Dly	.10
Iguazu Falls, Brazil.....	Mia P	1.69	.50	Su,F	.40
"	Bro P	1.91	.50	W,F	.40
"	Lgs P	2.48	.65	Tu,Th	.40
Iztepe, Mexico.....	Mia P	.76	.40	W	.10
"	Bro P	.41	.25	M,W,F	.10
"	Lgs P	.89	.40	M,W,F	.10
Joao Pessoa, Brazil (Cabedello)	Mia P	1.25	.50	Tu	.40
"	Bro P	1.64	.50	Sa	.40
"	Lgs P	2.20	.50	Sa	.40
Kingston, Jamaica.....	Mia P	.39	.25	Su,W,F	.10
La Guaira, Venezuela.....	Mia P	.81	.40	Dly	.25
"	Bro P	1.15	.50	Dly	.25
"	Lgs P	1.75	.50	Dly	.25

Destination	U. S. Gateway & Airline	RATES		Depart	Mail per 1/2 Oz.
		Per Lb.	Per \$100 Value		
La Paz, Bolivia.....	Mia P	1.25	.50	Su,Tu,W,Sa	.35
"	Bro P	1.30	.50	Su,M,Th,F	.35
"	Lgs P	1.95	.50	Su,W,Th,Sa	.35
Lima, Peru.....	Mia P	1.18	.50	Dly	.30
"	Bro P	1.24	.50	Dly	.30
"	Lgs P	1.88	.50	Dly	.30
Loja, Ecuador.....	Mia P	1.08	.50	Su,W,F	.30
"	Bro P	1.17	.50	M,W,F	.30
"	Lgs P	1.78	.50	Su,Tu,Th	.30
Maceio, Brazil.....	Mia P	1.26	.50	Su,Tu	.40
"	Bro P	1.68	.50	Su,F	.40
"	Lgs P	2.24	.50	Th,Sa	.40
Managua, Nicaragua.....	Mia P	.86	.40	Dly	.12
"	Bro P	.71	.40	Dly	.12
"	Lgs P	1.22	.50	Dly	.12
Manaos, Brazil.....	Mia P	1.24	.50	W,Sa	.40
"	Bro P	1.56	.50	M,Th	.40
"	Lgs P	2.13	.50	Su,W	.40
Manta, Ecuador.....	Mia P	1.03	.40	W,F	.30
"	Bro P	1.14	.50	Th,Sa	.30
"	Lgs P	1.74	.50	W,F	.30
Manzanillo, Cuba.....	Mia P	.26	.25	Dly ex Su	.25
Maracaibo, Venezuela (via Barranquilla)	Mia P	.69	.40	Su,W	.25
"	Bro P	1.08	.50	Dly	.25
"	Lgs P	1.66	.50	Dly	.25
Maracaibo, Venezuela (direct)	Mia P	.69	.40	Tu,Sa	.25
Matatlan, Mexico.....	Bro P	.57	.40	Dly	.10
"	Lgs P	.45	.25	Dly	.10
Medellin, Columbia (via Boquilla)	Mia P	1.06	.40	Su,W,F	.10
Medellin, Columbia (via Balboa)	Mia P	1.06	.40	Tu,Sa	.10
"	Bro P	1.10	.50	M,Th,F	.40
"	Lgs P	1.65	.50	Su,W,Th	.40
Mendoza, Argentina.....	Mia P	1.41	.50	M,W,Th,Sa	.40
"	Bro P	1.55	.50	M,W,Th,Sa	.40
"	Lgs P	2.11	.50	Su,M,W,	.40
Merida, Mexico.....	Mia P	.37	.25	W	.10
"	Bro P	.55	.40	Dly	.10
"	Lgs P	1.04	.40	Dly	.10
Mexicali, Mexico.....	Lgs P	.20	.18	Dly	.10
Mexico City, Mexico.....	Mia P	.60	.40	W	.10
"	Bro P	.26	.25	Dly	.10
"	Lgs P	.69	.40	Dly	.10
"	Lgs A	.70	.35	Dly	.10
"	Fv A	.42	.25	Dly	.10
"	Co A	.42	.25	Dly	.10
"	Sq A	.74	.35	Dly	.10
Minatitlan, Mexico.....	Mia P	.53	.40	W	.10
"	Bro P	.39	.25	Dly	.10
"	Lgs P	.50	.40	Dly	.10
Monterrey, Mexico.....	Fv A	.34	.25	Dly	.10
"	Co A	.34	.25	Dly	.10
"	Lgs A	.62	.35	Dly	.10
"	Sq A	.74	.35	Dly	.10
Montevideo, Uruguay* (See notes below)	Mia P	.20	.18	Dly ex Su,W	.10
Nassau, Bahamas.....	Mia P	1.25	.50	Su,Tu,Th,Sa	.40
Natal, Brazil.....	Bro P	1.61	.50	Su,Tu,Th,F	.40
"	Lgs P	2.18	.50	M,W,Th,Sa	.40
Oruro, Bolivia.....	Mia P	1.26	.50	Su,Tu,Th	.35
"	Bro P	1.33	.50	Su,Tu,F,Sa	.35
"	Lgs P	1.95	.50	M,Th,F,Sa	.35
Panama City, Panama (See Balboa, C. Z.)	Mia P	1.13	.50	Dly ex M	.40
Para (Belem), Brazil.....	Bro P	1.34	.50	Dly ex Sa	.40
"	Lgs P	1.95	.50	Dly ex F	.40
Paramaribo, Sur.....	Mia P	.97	.40	Dly ex Su	.30
"	Bro P	1.25	.50	Dly ex F	.30
"	Lgs P	1.90	.50	Dly ex Th	.30

* Shipments for Montevideo must be assessed rates to Buenos Aires plus 55c per 2 lbs. or fraction thereof (min. 55c) for forwarding by other carrier to Montevideo, plus \$1.10 per shipment transfer charge at Buenos Aires.

Destination	U.S. Gateway & Airlines	RATES		Depart	Mail per 1/4 Oz.
		Per Lb.	Per \$100 Value		
Parnahyba, Brazil.....	Mia P	1.21	.50	Su	.40
"	Bro P	1.48	.50	F	.40
"	Lgs P	2.04	.50	Th	.40
Point a Pitre, Guadeloupe.....	Mia P	.66	.40	Su,Sa	.15
"	Bro P	1.14	.50	M,F	.15
"	Lgs P	1.74	.50	Su,Th	.15
Port au Prince, Haiti.....	Mia P	.37	.25	Dly	.10
Port of Spain, Trinidad.....	Mia P	.79	.40	Dly ex Su	.15
"	Bro P	1.50	.50	Dly	.15
"	Lgs P	1.51	.50	Dly	.15
Porto Alegre, Brazil.....	Mia P	1.70	.50	Su,W,F	.40
"	Bro P	2.10	.50	M,W,Sa	.40
"	Lgs P	2.75	.65	Su,Tu,F	.40
Puerto Suarez, Bolivia.....	Mia P	1.41	.50	M,Th	.35
"	Bro P	1.56	.50	Tu,Sa	.35
"	Lgs P	2.13	.50	M,F	.35
Preston, Cuba.....	Mia P	.24	.25	Dly ex Sa	.10
Quito, Ecuador.....	Mia P	.97	.40	Dly	.30
"	Bro P	1.09	.50	Dly	.30
"	Lgs P	1.68	.50	Dly	.30
Recife, Brazil.....	Mia P	1.26	.50	Su,Tu,Th,Sa	.40
"	Bro P	1.65	.50	Su,Tu,Th,F	.40
"	Lgs P	2.21	.50	M,W,Th,Sa	.40
Rio de Janeiro.....	Mia P	1.50	.50	Su,W,F	.40
"	Bro P	1.98	.50	M,W,F	.40
"	Lgs P	2.54	.65	Su,Tu,Th	.40
Robore, Bolivia.....	Mia P	1.38	.50	Th	.35
"	Bro P	1.51	.50	Tu	.35
"	Lgs P	2.08	.50	M	.35
Salinas, Ecuador.....	Mia P	1.05	.40	Th,Sa	.30
"	Bro P	1.15	.50	Tu,Th	.30
"	Lgs P	1.75	.50	M,W	.30
Salta, Argentina.....	Mia P	1.30	.50	Su,Tu	.40
"	Bro P	1.45	.50	Su,F	.40
"	Lgs P	2.03	.50	Th,Sa	.40
San Ignacio, Bolivia.....	Mia P	1.33	.50	Th	.35
"	Bro P	1.48	.50	Tu	.35
"	Lgs P	2.04	.50	M	.35
San Jose, Bolivia.....	Mia P	1.35	.50	Th	.35
"	Bro P	1.50	.50	Tu	.35
"	Lgs P	2.08	.50	M	.35
San Jose, Costa Rica.....	Mia P	.89	.40	Dly	.15
"	Bro P	.76	.40	Dly	.15
"	Lgs P	1.31	.50	Dly	.15
San Juan, Puerto Rico.....	Mia P	.53	.40	Dly	.10
San Salvador, El Salvador.....	Mia P	.79	.40	Dly	.12
"	Bro P	.61	.40	Dly	.12
"	Lgs P	1.14	.50	Dly	.12
Santa Cruz, Bolivia.....	Mia P	1.28	.50	M,Th	.35
"	Bro P	1.43	.50	Tu,Sa	.35
"	Lgs P	1.99	.50	M,F	.35
Santiago, Chile.....	Mia P	1.38	.50	M,W,Th,Sa	.40
"	Bro P	1.51	.50	M,Tu,Th,Sa	.40
"	Lgs P	2.08	.50	Su,M,W,F	.40
Santiago, Cuba.....	Mia P	.26	.25	Dly ex Su	.10
Sao Luis, Brazil.....	Mia P	1.19	.50	Su,Tu,Th,Sa	.40
"	Bro P	1.43	.50	Su,Tu,Th,F	.40
"	Lgs P	1.99	.50	M,W,Th,Sa	.40
Sao Paulo, Brazil..... (via Rio)	Mia P	1.55	.50	Su,W,F	.40
"	Bro P	2.04	.50	M,W,Sa	.40
"	Lgs P	2.60	.65	Su,Tu,F	.40
Sao Salvador, Brazil..... (Bahia)	Mia P	1.28	.50	Su,Tu,Th,Sa	.40
"	Bro P	1.76	.50	Su,Tu,Th,F	.40
"	Lgs P	2.33	.65	M,W,Th,Sa	.40
St. Johns, Antigua, British West Indies.....	Mia P	.64	.40	Sa,Su	.15
"	Bro P	1.13	.50	M,Sa	.15
"	Lgs P	1.73	.50	Su,F	.15
St. Thomas, V. I.....	Mia P	.57	.40	Sa,Su	.10
"	Bro P	1.10	.50	M,F	.10
"	Lgs P	1.68	.50	Su,Th	.10
Talara, Peru.....	Mia P	1.08	.50	Dly	.30
"	Bro P	1.17	.50	Dly	.30
"	Lgs P	1.70	.50	Dly	.30
Tampico, Mexico.....	Bro P	.20	.18	Dly	.10
"	Lgs P	.81	.40	Dly	.10
Tapachula, Mexico.....	Bro P	.53	.40	Dly	.10
"	Lgs P	1.02	.40	Dly	.10

Destination	U.S. Gateway & Airlines	RATES		Depart	Mail per 1/4 Oz.
		Per Lb.	Per \$100 Value		
Tegucigalpa, Honduras.....	Mia P	.82	.40	Dly	.12
"	Bro P	.68	.40	Dly	.12
"	Lgs P	1.18	.50	Dly	.12
Tres Lagoas, Brazil.....	Mia P	1.53	.50	Su	.40
"	Bro P	1.66	.50	We	.40
"	Lgs P	2.23	.60	Tu	.40
Tucuman, Argentina.....	Mia P	1.34	.50	Su,Tu	.40
"	Bro P	1.49	.50	Su,F	.40
"	Lgs P	2.05	.50	Th,Sa	.40
Turbo, Columbia..... (via Barranquilla)	Mia P	1.06	.40	Su,W,F	.40
Turbo, Columbia..... (via Balboa, C. Z.)	Mia P	1.06	.40	Tu,Sa	.40
"	Bro P	1.10	.50	M,Th,F	.40
"	Lgs P	1.65	.50	Su,W,Th	.40
Tuxpan, Mexico.....	Bro P	.20	.18	Dly	.10
"	Lgs P	.83	.40	Dly	.10
Uyuni, Bolivia.....	Mia P	1.26	.50	Su,Tu	.35
"	Bro P	1.38	.50	Su,F	.35
"	Lgs P	1.95	.50	Th,Sa	.35
Veracruz, Mexico.....	Mia P	.57	.40	We	.10
"	Bro P	.33	.25	Dly	.10
"	Lgs P	.79	.40	Dly	.10
Victoria, Brazil.....	Mia P	1.41	.50	Su,Tu	.40
"	Bro P	1.90	.50	Su,F	.40
"	Lgs P	2.46	.65	Th,Sa	.40
Villahermosa, Mexico.....	Mia P	.49	.40	We	.10
"	Bro P	.43	.25	Dly	.10
"	Lgs P	.90	.40	Dly	.10

ATLANTIC LINES

Botwood, Newfoundland.....	Nyk P	.81	.40	Twice wk	.15
England via Foynes*.....	Nyk P	(Rates on Application)			.30
Foynes, Eire.....	Nyk P	(Rates on Application)			.30
"	Nyk P	1.78	.50	Twice wk	.30
"	Nyk P	2.00	.50	Dly	.30
Hamilton, Bermuda.....	Nyk P	.55	.25	Twice wk	.10
"	Nyk E	.55	.25		.10
Horta, Azores.....	Nyk P	1.70	.40	Once 2 wks	.30
Lisbon, Portugal.....	Nyk P	2.00	.50	Once 2 wks	.30
Scotland via Foynes*.....	Nyk E	(Rates on Application)			.30
"	Nyk P	(Rates on Application)			.30
Shediac, N. B.....	Nyk P	.51	.25	Twice wk	.08
Wales via Foynes*.....	Nyk E	(Rates on Application)			.30
"	Nyk P	(Rates on Application)			.30

ALASKA LINES

Bethel, Alaska.....	Ste P	1.11	.40	Schedules not published	.06
Fairbanks, ".....	Ste P	.90	.40	"	.06
Flat, ".....	Ste P	1.05	.40	"	.06
Galena, ".....	Ste P	1.00	.40	"	.06
Golovin, ".....	Ste P	1.08	.40	Nov. 1-Apr. 30	.06
Hot Springs, ".....	Ste P	.92	.40	Nov. 1-Apr. 30	.06
Juneau, ".....	Ste P	.56	.25	Schedules not published	.06
McGrath, ".....	Ste P	1.00	.40	"	.06
Nome, ".....	Ste P	1.11	.40	"	.06
Nulato, ".....	Ste P	1.03	.40	Nov. 1-Apr. 30	.06
Ophir, ".....	Ste P	1.03	.40	Schedules not published	.06
Ruby, ".....	Ste P	.99	.40	"	.06
Tanana, ".....	Ste P	.95	.40	Nov. 1-Apr. 30	.06
Whitehorse, Canada.....	Ste P	.66	.40	Schedules not published	.06

CANADIAN LINES

Toronto, Canada.....	Nyk A	.16	†	Dly	.06
"	Nyk T	.16	†	Dly	.06
Montreal, Canada.....	Nyk C	.12	†	Dly	.06
Windsor, Canada.....	Nyk A	.20	†	Dly	.06
"	Cg A	.12	†	Dly	.06
Winnipeg, Canada.....	GNW	.04	†	Dly	.06
Vancouver, Canada.....	U	.08	†	Dly	.06

* British Overseas Airways Corp. carries from Foynes, Ireland, to destinations in England, Scotland, and Wales.
† Canadian air express is carried on the same basis as air express within the U. S.; \$50 declared value free; excess charged at 10 cents per \$100 or fraction thereof.